OUTCOMES AND UTILIZATION FOR HOSPICE AND NON-HOSPICE NURSING FACILITY DECEDENTS

March
2000

U.S. Department of Health and Human Services
Assistant Secretary for Planning and Evaluation
Office of Disability, Aging and Long-Term Care Policy

Office of the Assistant Secretary for Planning and Evaluation

The Office of the Assistant Secretary for Planning and Evaluation (ASPE) is the principal advisor to the Secretary of the Department of Health and Human Services (HHS) on policy development issues, and is responsible for major activities in the areas of legislative and budget development, strategic planning, policy research and evaluation, and economic analysis.

The office develops or reviews issues from the viewpoint of the Secretary, providing a perspective that is broader in scope than the specific focus of the various operating agencies. ASPE also works closely with the HHS operating divisions. It assists these agencies in developing policies, and planning policy research, evaluation and data collection within broad HHS and administration initiatives. ASPE often serves a coordinating role for crosscutting policy and administrative activities.

ASPE plans and conducts evaluations and research–both in-house and through support of projects by external researchers–of current and proposed programs and topics of particular interest to the Secretary, the Administration and the Congress.

Office of Disability, Aging and Long-Term Care Policy

The Office of Disability, Aging and Long-Term Care Policy (DALTCP) is responsible for the development, coordination, analysis, research and evaluation of HHS policies and programs which support the independence, health and long-term care of persons with disabilities–children, working age adults, and older persons. The office is also responsible for policy coordination and research to promote the economic and social well-being of the elderly.

In particular, the office addresses policies concerning: nursing home and community-based services, informal caregiving, the integration of acute and long-term care, Medicare post-acute services and home care, managed care for people with disabilities, long-term rehabilitation services, children's disability, and linkages between employment and health policies. These activities are carried out through policy planning, policy and program analysis, regulatory reviews, formulation of legislative proposals, policy research, evaluation and data planning.

This report was prepared under contract #100-97-0010 between the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, Office of Disability, Aging and Long-Term Care Policy and the MEDSTAT Group. For additional information about this subject, you can visit the DALTCP home page at http://aspe.hhs.gov/daltcp/home.htm or contact the ASPE Project Officer, Jennie Harvell, at HHS/ASPE/DALTCP, Room 424E, H.H. Humphrey Building, 200 Independence Avenue, S.W., Washington, D.C. 20201. Her e-mail address is: jharvell@osaspe.dhhs.gov.

The goal of ASPE's Medicare Hospice Benefit study is to provide general information on the role of the Medicare hospice benefit and more specific information about how end of life care is provided to institutionalized beneficiaries. Six reports have been produced from this study:

Synthesis and Analysis of Medicare's Hospice Benefit: Executive Summary and Recommendations (report 1) briefly summarizes the methods used for each report and the findings and recommendations that emerged from each of the following reports under this study.

Important Questions for Hospice in the Next Century (report 2), synthesizes the literature related to the Medicare hospice benefit and summarizes discussions with key informants on the use of hospice in nursing homes.

Medicare's Hospice Benefit: Use and Expenditures (report 3), analyzes Medicare utilization and payments for hospice users in 1996.

Use of Medicare's Hospice Benefit by Nursing Facility Residents (report 4), examines differences in hospice utilization and expenditures as a function of when nursing facility residents started using hospice services (i.e., before or during a nursing home stay).

Outcomes and Utilization for Hospice and Non-Hospice Nursing Facility Decedents, (report 5) compares pain management and types of services provided to dying nursing home residents receiving hospice compared to other dying residents who did not receive hospice.

Hospice Benefits and Utilization in the Large Employer Market (report 6), reports on how hospice services are provided by 52 large employers and used by their employees, and identifies alternative approaches to designing and administering hospice benefits.

All of these reports are available on ASPE's Office of Disability, Aging and Long-Term Care Policy website (http://aspe.hhs.gov/daltcp/home.htm). Copies can be mailed out by contacting the Office of Disability, Aging and Long-Term Care Policy, Room 424E, H.H. Humphrey Building, 200 Independence Avenue, S.W., Washington, D.C., by fax at 202-401-7733, or by email at DALTCP2@osaspe.dhhs.gov.

Outcomes and Utilization for Hospice and Non-Hospice Nursing Facility Decedents

March 2000

Center for Gerontology and Health Care Research
Brown University

Susan C. Miller, Ph.D., MBA
Pedro Gozalo, Ph.D.
Vincent Mor, Ph.D.

This report was prepared for the Office of Disability, Aging, and Long Term Care Policy in the Office of the Assistant Secretary for Planning and Evaluation, US Department of Health and Human Services under contract to the Urban Institute. The project officers were Jennie Harvell, ASPE and Carol Blackford, Health Care Financing Administration.

Report 5 of 6

TABLE OF CONTENTS

INTRODUCTION

Care in the nursing facility offers an opportunity to provide a full range of intensive palliative services to dying nursing facility patients that may improve their quality of life. Since legislation has provided for the provision of hospice care in nursing facilities (Omnibus Budget Reconciliation Acts of 1985 and 1989), these palliative services are more often provided by contracted hospice providers. However, although research on pain assessment and management in nursing facilities (Bernabei et al., 1998; Ferrell, 1995; Wagner, 1996) supports the notion that end of life care in nursing facilities may be less than optional, we know little about the care provided to dying nursing facility patients or how the presence of hospice influences this care.

This comparative study first identifies and describes two cohorts of nursing facility decedents, those that did and did not elect Medicare hospice. Then, using data for up to one year prior to death, the study characterizes utilization and quality of care for these two cohorts. The influence of Medicare hospice on hospital utilization and symptom management at the end of life in nursing facilities is examined through multivariate analyses and findings of these analyses are presented and discussed.

METHODS

Data Sources and Population Studied

We used 1992-1996 nursing facility resident assessment data (MDS data), detailed prescription drug information, and Medicare claims data for patients in the states of Kansas, Maine, Mississippi, New York and South Dakota to study hospice care in nursing homes. These data sources were introduced in the report, Use of Medicare's Hospice Benefit by Nursing Facility Residents of this study, and are described at length in Appendix A. To

identify hospice enrollment, hospitalization, and death we linked MDS data with 1991 through 1997 HCFA claims data and with HCFA's 1997 denominator file. An overall match rate of 87 percent was obtained.

Of the 204,374 nursing facility patients identified in 1992 through 1996, who died in 1992 through 1997, and who had usable data, 11,395 (5.6 percent) elected hospice between 1991 and 1997. Only patients electing hospice after nursing facility admission and prior to 1997 were retained, resulting in 8,466 hospice patients for study. In order to observe the hospice influence, hospice patients included in the comparative analyses had to have at least 1 resident assessment (MDS) completed after hospice admission[1] and at least 2 assessments total[2]. Only 2,655 of the 8,466 eligible hospice patients (31.4 percent) had a MDS after hospice admission, but all of these patients had at least 2 assessments.

A sample of non-hospice patients having at least 2 MDS assessments present was chosen. Three non-hospice patients were chosen for each hospice patient, matching on the time interval from last MDS to death, 1 of 4 diagnosis groups, and state of nursing home residence. For 2 hospice patients only 2 non-hospice matches were identified and for 11 hospice patients not even 2 matches could be identified. These 11 hospice patients were excluded from study resulting in 2,644 hospice patients and 7,929 non-hospice patients for study. Table 1 provides specifics on how the sample numbers were derived.

---

[1] There is currently no requirement that a new resident assessment (i.e., MDS) be performed when a patient is admitted to hospice.

[2] The reason the presence of two MDS assessments was needed for the comparative analyses is discussed in Appendix A.

It is important to note the implications of our requiring that all hospice patients in the comparative analysis have a post hospice admission MDS assessment. This results in the exclusion of most short stay hospice patients, and, therefore, the comparative sample represents longer stay nursing facility hospice beneficiaries. Hospice patients having a post hospice MDS present compared to those without this assessment more closely resemble nursing facility long-term care residents as they more often have dementia diagnoses, are older, are more often unmarried, and are more functionally and cognitively impaired (Tables 2 and 3). Patients with a post hospice MDS have a mean length of hospice stay of 131.9 days (SD 138.5) and a median stay of 90 days while those without a post hospice MDS have a mean length of hospice stay of 30.1 days (SD 55.4) and a median stay of 12 days. However, both groups of patients have median nursing facility stays of at least one year (Table 2).

Measures

Outcomes

We examine two outcome variables that reflect the nature of clinical care provided terminally ill patients--pain management (regular treatment) and management of persistent mood disturbance.[3] We also examine the utilization of acute care hospitalization at the end of life. The last resident assessment (MDS) completed prior to death was used to obtain the relevant symptom and drug information as well as the data on the pertinent covariates.

The pain management outcome variable is based upon pharmacologic treatment of the population of patients with daily pain. Patients in pain who receive no analgesic or other than regular analgesic treatment are considered to have inadequate pain management. This

[3] Appendix A describes the MDS documentation of pain and persistent mood disturbance.

outcome variable provides some indication that at least some attempt was being made at managing pain.

Regular analgesic treatment was predicated on the World Health Organization (WHO) analgesic control ladder (Levy, 1996; Stjernsward, 1988; Zech et al., 1995); level 1: salicylates, acetaminophen, and nonsteroidal anti-inflammatory drugs; level 2: codeine phosphate or codeine sulfate, oxycodone hydrochloride, hydrocodone bitartrate, propoxyphene hydrochloride or propoxyphene napsylate, meperidine hydrochloride, pentazocine hydrochloride or pentazocine lactate, buprenorphine hydrochloride, nalbuphine hydrochloride, butorphanol tartrate and any combination of these compounds with WHO level 1 drugs (mostly with acetaminophen and aspirin); and level 3: morphine sulfate, hydromorphone hydrochloride, oxymorphone hydrochloride, methadone hydrochloride, levorphanol tartrate, and fentanyl citrate. Next, for each level of drug we calculated frequency of administration and route of administration. We had considered calculating morphine equivalents but there is no consensus as to how to convert non-narcotic analgesics into morphine equivalents. Furthermore, there was concern that staff assessments of pain may have reflected controlled or uncontrolled pain (since level of pain is not specified in the MDS version used here). Consequently, we used a very conservative standard in determining whether the patient was receiving analgesic pain management interventions. Patients in daily pain receiving no analgesia were clearly untreated. Any level of analgesic (any WHO level treatment) was deemed treatment when it was given for 5 days prior to the last MDS, and at least twice a day, or, for level 3 analgesics, if the patient received the medication via a drug patch.

Our persistent mood disturbance outcome variable examines whether patients with persistent mood disturbance receive antidepressant or antianxiety/hypnotic medication. The MDS assessment has 2 specific drug data items that are used to derive this outcome variable. For each of these items, the number of days in the 7 days prior to assessment that the patient received antidepressants or antianxiety/hypnotic medication is recorded. These data were derived from the summary drug listing and not the detailed drug coding used to determine whether pain was being treated. We considered drug management of persistent mood disturbance to be adequate when patients with persistent mood disturbance received either of these medication types for at least 5 of the 7 days prior to MDS assessment.

Independent Variable

Our analyses test the effect of hospice enrollment on Medicare service utilization and symptom management. We study the intent to treat here since a proportion of hospice enrollees (35 percent) did not remain on the benefit until the time of the last MDS. (Of note is that this proportion discharged from hospice is higher than observed for all "post" hospice patients (15 percent) since, as discussed in the report Use of Medicare's Hospice Benefit by Nursing Facility Residents of this study, longer-stay hospice patients are much more likely to be discharged from hospice than are shorter-stay patients.) For some analyses we excluded these discharged hospice patients to determine how their exclusion influenced our findings, and by and large, the effects were the same with and without these patients who were not under hospice care around the time of their deaths. However, the hospice effects relating to hospitalization are much greater when these hospice patients are removed, and these descriptive differences are shown. Nonetheless, we present all multivariate findings including the entire hospice sample.

Covariates and Variables for Comparative and Descriptive Analysis

For comparative analyses, patient-level covariates are used to control for case mix. These variables were chosen based upon a systematic literature review, previous related work performed by the authors and their colleagues at Brown's Gerontology Center (i.e., hospital utilization studies and pain management in nursing facilities), and, to some extent, by preliminary analyses. Our analyses also control for the state in which the nursing facility resident resides. Furthermore, all non-tabular analyses were performed by clustering observations, residents, within each of the facilities included in this study. This "mixed effects" model essentially adjusts for the fact that residents within a facility cannot be considered to be independent observations.

Patient Variables. A variety of patient level variables were taken from the MDS and HCFA eligibility data files for use in comparative and multivariate analyses. The last MDS assessment prior to death is the data source for most of the patient level covariates used in comparative analyses. The data source for the previous symptom status was the penultimate MDS. Covariates are summarized in more detail in Table A1 in Appendix A.

Diagnoses. Diagnoses on inpatient claims and the MDS assessments were used to derive the diagnosis groups. (See Table A1 in Appendix A for specifics.)

Cognitive Performance. The cognitive performance scale (CPS) was used to measure and control for cognitive function (Morris et al., 1994). The CPS was designed to assign residents into easily understood cognitive performance categories. The CPS score ranges from 0 (intact) to 6 (very severe impairment). (See Appendix A for a discussion of this scale's validity and reliability.)

Activities of Daily Living. The evaluation of function in the MDS is based on the ability to perform activities of daily living (Lawton & Brody, 1969). The ADL classification is based on six-levels of self-performance including dressing, eating, toilet use, bathing, locomotion, transfer, and continence. Staff evaluate residents in each of these areas using a five-point scale as independent, needing supervision, needing limited assistance, needing extensive assistance, or totally dependent. We calculated a 6-point ADL scale ranging from 1 (minimal oversight) to 6 (highly dependent). (See Appendix A for a discussion of this scale's validity and reliability.)

Facility Variables. We constructed a contextual facility variable, hospice concentration. This variable represents a ratio of the total number of unduplicated hospice patients in a nursing facility in a one year period to the total number of unduplicated residents in that nursing facility during the same time period (see Table A1 in Appendix A). A facility's hospice concentration value for a particular year is linked to a patient's last MDS assessment prior to death and occurring in the same year.

Hospice concentration within a nursing home should reflect both the length of the hospice-nursing home relationship and the success of the relationship. In line with the Resource Dependency Theory (Oliver, 1991; Pfeffer and Salancik 1978), greater success (i.e., greater hospice concentration) is reflective of a nursing home's greater accommodation to hospice care management practices and hospice philosophies. Considering this, we compare care and service utilization for hospice and non-hospice nursing home residents by a nursing home's hospice concentration to examine whether non-hospice patients in nursing facilities having a greater hospice presence have care and utilization more compatible with that of hospice patients.

Methods of Analysis

Analyses of dichotomous outcome measures, such as adequacy of pain management, were performed using logistic regression with a generalized estimating equation (GEE) in SAS GENMOD (SAS Institute Inc., 1997). The use of GEE adjusted for the correlation between persons residing in the same nursing facility. Since we had no evidence to the contrary, we assumed that patient within facility correlations are exchangeable (did not differ) across facilities. Analyses of inpatient days in the 30 days, 90 days and 6 months prior to death were performed using linear regression with the Poisson model and GEE.

All multivariate models control for patient case-mix using identical patient-level variables. The models also control for the state of nursing facility residence, and, through GEE, the non-independence of patients in the same nursing facility. Last, since New York patients represent 62 percent of the patients in this comparative study, we run all of our main multivariate analyses excluding New York to assure that we are not observing a hospice effect occurring in New York only.

RESULTS

Comparative Descriptive Analyses

Overview

In reviewing these comparative analyses it must be kept in mind that the hospice patients included in these comparative analyses, because of the inclusion criterion requiring the presence of a post hospice admission MDS, represent longer stay hospice nursing facility patients (Tables 2 and 3). In spite of the limitations that this imposes on the "generalizability" of the comparative study results, we felt that the exclusions made were merited for two reasons. First, without a MDS after hospice election we could not measure outcomes

experienced by hospice and non-hospice patients as they approached death (see footnote #1). Second, we felt that it was important to include patients in these comparative analyses who had had an opportunity to be exposed to the influence of hospice care as provided in the nursing facility setting (i.e., patients electing hospice after nursing facility admission).

Sociodemographic and Clinical Characteristics of Hospice and Non-Hospice Patients

Overall, the hospice and non-hospice comparative samples appear similar (Table 4). However, hospice patients are more often female than are non-hospice patients (73.3 percent versus 63.6 percent) and non-hospice patients are more frequently minorities, are more likely to have never been married, and are less likely to be widowed than are hospice patients (Table 4).

In terms of clinical status, hospice patients have slightly greater limitations in activities of daily living and in cognitive performance than do non-hospice patients (Table 4). In addition, hospice patients are more likely to have a low body mass index than are non-hospice patients. As anticipated, greater proportions of patients enrolled in hospice have advance directives documented as present on the ultimate MDS than do non-hospice study patients (Table 4).

Symptom Prevalence in Hospice and Non-Hospice Decedents

Overview

Ascertainment bias is identified here in relation to symptom assessment. Using the last MDS assessment completed prior to death, the ultimate MDS, hospice patients are more likely to have symptoms documented as present than are non-hospice patients. Generally, when a symptom is documented as present on the penultimate MDS, we observe much

smaller differences between hospice and non-hospice symptom prevalence on the MDS prior to death. On the other hand, when the symptom is not documented as present on the penultimate MDS assessment, we observe higher symptom prevalence for hospice versus non-hospice patients on the ultimate MDS.

Of course, it can be legitimately argued that patients referred to hospice may have a greater prevalence of symptoms than those not referred and that this may account for the greater prevalence of symptoms observed for hospice enrollees. However, based on in depth examination of factors associated with documented pain prevalence (as discussed below), this does not appear to be wholly the case.

An important note that is discussed extensively in Appendix A is that the daily pain item on the MDS does not capture the intensity of pain. Because of this, reductions in pain intensity could not be observed.

Tables 5 - 13 present symptom prevalence data by nursing facility hospice concentration and diagnosis groups. Specifics regarding each symptom's prevalence are discussed below. Of note is that some hospice patients are categorized in the "None" category because, relative to the total number of admissions and residents, the few hospice patients result in the nursing facility's hospice concentration being below .01 percent.

Daily Pain

Documented prevalence of pain on the ultimate MDS is lower for non-hospice patients than it is for hospice patients. Depending upon the diagnosis group, differences in pain prevalence between hospice and non-hospice patients range from 8.2 percent to 15.6 percent (Table 5). The greatest percentage point difference (of 15.6 percent) is observed for patients with cancer and no dementia and the smallest difference is observed for patients with

dementia (8.2 percent). Although not consistent, there do appear to be smaller differences in pain prevalence between hospice and non-hospice patients when patients reside in nursing facilities with higher hospice concentrations (Table 5).

For patients with daily pain absent on the penultimate MDS, higher overall pain prevalence on the ultimate MDS is observed for hospice patients (18 percent) versus non-hospice patients (10 percent) (Table 7). This difference provides support for the notion that pain is under-detected prior to hospice admission. For patients with cancer, with and without dementia, the difference in documented pain prevalence between hospice and non-hospice patients is lower when hospice concentrations are 5+ percent as opposed to <5 percent (Table 7), indicating better detection of pain in nursing facilities having higher hospice concentrations.

Contrary to the above, when patients had daily pain documented as present on the penultimate assessment, slightly lower pain prevalence is observed on the ultimate MDS for hospice versus non-hospice patients who have dementia and no cancer (63.1 percent and 66.7 percent respectively) and who have "other" diagnoses (63.5 percent and 64.1 percent respectively) (Table 6). This observation indicates that hospice may influence reductions in pain for patients with these diagnoses. However, without the availability of pain intensity scores, any hospice influence on the outcome of pain could not be observed.

By conducting multivariate analyses we further investigated the factors associated with daily pain being documented as present on the MDS prior to death (Miller, Gozalo & Mor, 1999). The multivariate models controlled for the presence of pain on the penultimate MDS, for patient case mix variables previously found to be associated with the documentation of daily pain on the MDS (Bernabei et al., 1998), state of residence, and for

the non-independence of patients residing in the same nursing facility. We ran the model for all hospice and non-hospice decedents and also conducted analyses stratified by diagnosis groups. Including all hospice and non-hospice decedents, hospice enrollment was significantly associated with pain being documented as present on the ultimate MDS (odds ratio 1.63, 95 percent CI 1.36, 1.94) (data not shown). In addition, within each diagnosis group hospice enrollment was statistically significantly associated with an increased probability of daily pain being documented. Hospice patients with dementia and no cancer were twice as likely to have daily pain documented, with other diagnoses 89 percent more likely, with cancer and dementia 53 percent more likely, and with cancer and no dementia 43 percent more likely to have daily pain documented than were non-hospice patients (data not shown). These findings support the premise that pain ascertainment bias is present and that daily pain is more likely to be under-detected in non-hospice patients having dementia or diagnoses other than cancer.

Shortness of Breath / Dyspnea

Although hospice patients have a higher documented prevalence of dyspnea, the differences in documented prevalence of dyspnea between hospice and non-hospice patients by diagnosis groups are lower than the differences observed for pain prevalence. Prevalence differences range from .3 percent for patients with cancer and no dementia to 10.2 percent for patients with "other" diagnoses (Table 8).

When dyspnea is documented as present on the penultimate MDS, hospice patients in all diagnosis groups except cancer with dementia have a lower prevalence of dyspnea documented on the ultimate MDS than do non-hospice patients (Table 9). These reductions provide some support that hospice involvement may reduce the presence of dyspnea. When

dyspnea is absent on the penultimate MDS assessment, hospice patients in all diagnosis groups have a higher prevalence of dyspnea documented on the ultimate assessment than do non-hospice patients (Table 10), indicating the probable presence of at least some ascertainment bias.

Persistent Mood Disturbance

A higher prevalence of persistent mood disturbance is documented on the ultimate MDS for hospice patients, versus non-hospice patients, for all diagnosis groups except cancer with dementia (Table 11). For patients having cancer with dementia, there is essentially no prevalence difference between hospice and non-hospice patients (Table 11).

When patients have mood disturbance documented on the penultimate assessment, hospice patients with cancer and no dementia and with "other" diagnoses have a slightly higher prevalence of persistent mood disturbance documented on the ultimate MDS than do non-hospice patients (Table 12). This pattern is also observed when mood disturbance is not documented on the penultimate assessment (Tables 13). Hospice patients with dementia, with or without cancer, have a slightly lower prevalence of mood disturbance documented on the ultimate MDS assessment, both when mood disturbance is documented on the penultimate MDS and when it is not (Tables 12 and 13).

Utilization of Analgesics and of Special Treatments by Hospice and Non-Hospice Patients

Hospice patients in daily pain are twice as likely to receive level 3 analgesics (per the WHO ladder) than are non-hospice patients in daily pain (48.9 percent versus 24.2 percent) (Table 14). The difference in the proportion of hospice versus non-hospice patients receiving level 3 analgesics is slightly smaller in nursing facilities with a 9+ percent hospice

concentration (difference of 13.3 percent) than the difference observed in facilities with a .01 to <9 percent hospice concentration (difference 15.9 percent) (Table 14).

Tables 15 and 16 show the special treatments received by hospice patients in the 7 days prior to their ultimate MDS. As a reminder, the median time between the ultimate MDS and death was 31 days for hospice patients and 32 days for non-hospice patients, and the mode was 8 days for hospice and 7 days for non-hospice patients. Across all special treatments, and almost all variable categories, hospice patients receive fewer of these treatments than non-hospice patients do. Hospice patients are less likely than non-hospice patients to be restrained, to receive tube or parenteral/IV feelings, and to be given medications via intramuscular or intravenous routes. Hospice patients also consistently receive less occupational, speech, and physical therapy (Tables 15 and 16).

Non-hospice decedents in nursing facilities having a 5+ percent hospice concentration were less often physically restrained than were non-hospice decedents in facilities with a <5 percent hospice concentration (14.3 percent versus 9.5 percent) (data not shown). Additionally, non-hospice decedents in nursing facilities with a 5+ percent hospice concentration were more likely than non-hospice decedents in facilities with a <5 percent hospice concentration to receive physical therapy (19.7 percent versus 15.5 percent), occupational therapy (11.4 percent versus 6.3 percent), or speech therapy (4.8 percent versus 1.4 percent).

Acute Care Hospitalization for Hospice and Non-Hospice Decedents

Tables 17 through 19 compare acute care hospital use for hospice and non-hospice patients by state of nursing facility residence. Table 17 includes all hospice and non-hospice patients. However, Table 18 includes only those hospice patients (and the matched non-

hospice patients) who received hospice for the entire last 30 days of life, and Table 19 includes only hospice patients (and the matched non-hospice patients) who received hospice for the entire last 90 days of life. It is clear from all the tables that much higher proportions of hospice and non-hospice patients in Mississippi are hospitalized than are hospitalized in the other study states (Tables 17 - 19). The availability of hospital beds has previously been found to be associated with increased hospital use by dying individuals (Pritchard et al., 1998; Wennberg, 1998) and, with the exception of South Dakota, Mississippi has substantially more hospital beds per 100,000 population than do the other study states (Lamphere, Holahan, Brangan, and Burke, 1997).

Hospice patients consistently have fewer hospitalizations, with the greatest differences observed 30 days prior to death. The differences in hospitalization rates between hospice and non-hospice patients in the 30 days prior to death range from 9.8 percent to 31.7 percent (Table 17). However, with the removal of hospice patients not receiving hospice for the entire last 30 days of life (and the matched non-hospice patients), hospitalization rate differences between hospice and non-hospice patients range from 24 percent to 50 percent (Tables 18). When hospice patients not receiving hospice for the entire last 90 days of life (and the matched non-hospice patients) are removed from analyses, we observe in Tables 17 and 19 similar changes in rates comparisons between hospice and non-hospice patients as observed between Tables 17 and 18.

In most of the study states a nursing facility's hospice concentration appears to have a strong influence on the hospitalization patterns of non-hospice patients. Non-hospice patients in nursing facilities having no hospice involvement had a 30 percent probability of being in a hospital on the day of death, a 16 percent probability of being in a hospital 15 days

before death, and a 12 percent probability 30 days before death. In contrast, when there was a .01 to 5 percent hospice concentration, non-hospice patients had a 24 percent probability of being in a hospital on the day of death, a 13 percent probability 15 days before death and an 11 percent probability 30 days before death. Non-hospice patients in nursing facilities with a 5+ percent hospice concentration had a 21 percent probability of being in the hospital on the day of death, an 11 percent probability 15 days before death and a 10 percent probability 30 days before death (data not shown). These differences by concentration were strongest in New York State. In Mississippi and Maine the differences observed by concentration were similar to those observed in New York, and in South Dakota they were somewhat similar. In Kansas, however, the probabilities of being in a hospital were in the opposite direction, with a higher probability of being in a hospital observed when hospice concentration was higher (data not shown). Further investigation is needed to determine why the influence of hospice concentration is so different in Kansas.

Medicare Expenditures

In their last month of life hospice decedents with hospice lengths of stay of 30 days or less incur $525 less in average total Medicare expenditures than their matched controls (Table 20). Hospice decedents with lengths of stay of 30 days or more incur $1149 less in average total Medicare expenditures than their matched controls in their last month of life (Table 20).

When considering Medicare expenditures in the last 6 months of life, only hospice patients with stays of 30 days or less have smaller total Medicare expenditures than their matched controls (Table 21). Overall, hospice decedents incur an average of $2,643 more in total average Medicare expenditures than do their matched controls in the last 6 months of

life (Table 21). It must be noted that Medicare skilled nursing and home health care expenditures for hospice decedents shown in Tables 20 and 21 were incurred prior to hospice admission. In addition, Medicare non-hospice inpatient care expenditures are generally incurred prior to hospice admission and may be incurred after hospice discharge since we include here all hospice patients, not only those who died while on the hospice benefit.

Multivariate Comparative Analyses

Pain Management for Hospice and Non-Hospice Decedents

Hospice enrollment is significantly associated with a 93 percent (95 percent CI 1.56, 2.38) increased likelihood that patients in daily pain will have at least some attempt made at managing their pain (will receive regular treatment for pain) (Table 22). Being older and having congestive heart failure are significantly associated with a reduced probability that patients will receive regular pain management. For every year of advanced age there is a 2.4 percent reduction in the likelihood that patients will receive regular treatment for their pain. Patients with congestive heart failure have a 28 percent reduced likelihood that they will receive regular pain management. Using an identical model, but excluding New York we find that hospice enrollment is still significantly associated with a greater likelihood of regular pain management. In Kansas, Maine, Mississippi and South Dakota, hospice nursing facility patients with daily pain (versus non-hospice patients) have an 84 percent (95 percent CI 1.44, 2.36) increased likelihood of receiving regular treatment for their pain (data not shown). Additionally, older patients having congestive heart failure continue to have a statistically significant reduced likelihood of receiving regular treatment for their daily pain (data not shown).

It is important to note that a high percentage of hospice and non-hospice patients do not receive regular treatment for their pain. Fifty-seven percent of hospice patients (404 of 712 with daily pain) and 39 percent of non-hospice patients (520 of 1,331 with daily pain) receive regular treatment for their pain (data not shown). When considering only those hospice patients on hospice at the time of the last MDS, the percent of hospice patients receiving regular treatment only increased slightly, to 59 percent (data not shown).

The Medication Treatment of Persistent Mood Disturbance for Hospice and Non-Hospice Decedents

Although hospice enrollment is associated with an increased likelihood that patients with persistent depression and/or anxiety will receive an antidepressant or antianxiety/hypnotic medication, this effect is not statistically significant (AOR 1.26 95 percent CI .94, 1.67) (Table 22). The wide confidence interval for the hospice effect suggests that we have inadequate power to test this hypothesis. (After exclusions for missing data the total number of hospice and non-hospice patients in this analysis was 1,129). When New York patients are removed from the model, there is still no significant hospice effect observed. It is important to note that neither a high percentage of hospice or non-hospice patients received antidepressant or antianxiety/hypnotic medication for persistent mood disturbance. Fifty percent of hospice patients (197 of 395 with persistent mood disturbance) and 43 percent of non-hospice patients (424 of 989 with persistent mood disturbance) received this treatment (data not shown). When considering only those hospice patients on hospice at the time of the last MDS, the percent of hospice patients receiving treatment only increased slightly, to 53 percent (data not shown).

Acute Inpatient Care Utilization by Hospice and Non-Hospice Decedents

Hospice versus non-hospice patients are significantly less likely to be admitted to a hospital at 30, 90 and 180 days (Table 23). It is important to note that all hospice patients (and the matched non-hospice patients) are included in these multivariate analyses. Since hospice patients without a hospice stay of at least 30 or 90 days and hospice patients who were discharged before the last 30 or 90 days of life were not excluded from these analyses, the hospice effects presented below are very conservative estimates. Also, since hospice enrollment is associated with increased use of advance directives, the inclusion of do not hospitalize and do not resuscitate directives in the multivariate model reduces the observed hospice effect.

At 30 days, hospice patients are 70 percent (95 percent CI .25, .34) less likely to be hospitalized than are non-hospice patients. Independent of hospice enrollment, patients with congestive heart failure are more likely to be hospitalized in the last 30 days of life, and patients with do not resuscitate and/or do not hospitalize advance directives are less likely to be hospitalized than are patients without these advance directives (Table 23). Additionally, patients with nursing home stays of less than 90 days are 30 percent more likely to be hospitalized than are longer stay patients. The state of nursing facility residence has a huge, significant effect on the probability of hospitalization. Patients in Mississippi are over 5 times as likely to be hospitalized than are nursing facility patients in Maine (the reference state). Patients in New York, Kansas and South Dakota are approximately twice as likely to be hospitalized in the last 30 days of life as are patients in Maine (Table 23). Excluding the hospice and non-hospice patients from New York, hospice enrollment is significantly associated with a 72 percent (95 percent CI .23, .32) reduced probability of being

hospitalized in the last 30 days of life (data not shown). In the study states other than New York, non-whites are significantly more likely to be hospitalized, with a 71 percent (95 percent CI 1.05, 2.36) greater likelihood of being hospitalized in the last 30 days of life (data not shown). Additionally, older age is significantly associated with a decreased probability of hospitalization in the non-New York states, and the effect of short stays on hospitalization is are only marginally significantly (p=.06).

Hospice enrollment is also significantly associated with a reduced probability of hospitalization in the last 90 days of life (OR=.39, 95 percent CI .34, .45). At 90 days prior to death, in addition to the significant associations described above for 30 days prior to death, being older and cognitive impairment are significantly associated with reductions in hospitalization (Table 23). Also, at 90 days prior to death, more deficit in activities of daily living (ADLs) is significantly associated with an increased likelihood of hospitalization. The hospitalization effects associated with advance directives and state of residence are similar at 90 days as they are at 30 days (Table 23). However, patients with nursing facility stays of less than 90 days are over 3 times as likely to be hospitalized in the last 90 days of life than are longer stay patients. Excluding patients residing in New York from the multivariate model, hospice patients are 57 percent (95 percent CI .35, .51) less likely to be hospitalized than are non-hospice patients in the last 90 days of life (data not shown). Independent of hospice enrollment, all other significant associations described above for all study patients are similar for study patients in the states other than New York. However, a do not hospitalize advance directive is only marginally significantly associated (p=.06) with a reduced risk of hospitalization when New York patients are excluded (data not shown).

In the last 6 months of life, hospice enrollment is associated with a significant reduction in hospitalization (OR .55, 95 percent CI .48, .63). Similar statistically significant associations between the non-hospice variables and hospitalization that are present when examining hospitalization in the last 90 days of life are also observed in the last 6 months of life (Table 23). In addition, being male, being married, and/or having a cancer diagnosis are associated with a significant increased probability of hospitalization in the last 6 months of life. Having a nursing facility stay of less than 90 days is significantly associated with a 6 times greater risk of hospitalization in the last 6 months of life (Table 23). In study states other than New York, hospice enrollment continues to be associated with a significant reduction in hospitalization in the last 6 months of life (OR .64, 95 percent CI .52, .75) (data not shown). All other associations are similar when modeling all study states but New York, although ADL impairment is not significantly associated with increased hospitalization when New York patients are removed (data not shown).

Table 24 portrays multivariate-modeling results for hospital days. These models show that hospice enrollment is significantly associated with reductions in hospital days at 30 days, 90 days and 6 months prior to death. The associations observed on Table 23, for the probability of hospitalization, are very similar to those observed when we examine hospital days (Table 24).

DISCUSSION

Overview

This study provides the first examination of the "value added" of hospice care provided to nursing facility residents. We find that, relative to non-hospice patients, hospice patients are significantly less likely to be hospitalized in the last 30 and 90 days, and last 6

months of life. Findings also reveal that hospice patients in nursing facilities had superior pain assessments since pain was more likely to be detected. Additionally, among those patients assessed as being in daily pain, those under hospice care were significantly more likely to be treated with pain medications and less likely to receive medications via intramuscular or intravenous routes. Last, lower proportions of hospice patients compared to non-hospice patients had physical restraints, received occupational, speech and physical therapy, and received parenteral/IV feeding or had feeding tubes. As a whole, these findings suggest that the "value added" of hospice care may be an increased quality of life at the end of life, at least for longer stay hospice patients in nursing facilities.

Symptom Assessment and Management of Pain and Persistent Mood Disturbance

Nursing facility hospice patients are more likely to have pain and dyspnea assessed as being present than are non-hospice patients. Additionally, the prevalence of pain and dyspnea documented for hospice patients is more in agreement with the literature (Desbiens et al., 1998; Lynn et al., 1997b; Watchtel et al., 1988) than is the exceedingly low prevalence documented for non-hospice patients. Even when controlling for patient case mix, the presence of pain on the penultimate assessment and the non-independence within nursing facilities, hospice enrollment resulted in a greater likelihood that daily pain would be documented, and this was especially true for patients with dementia or with "other" diagnoses.

In relation to the assessment of pain, the assessment skills demonstrated by hospice staff appear to "spill over" to the rest of the facility when nursing facilities have higher hospice concentrations. This "spill over" hospice effect is demonstrated by the smaller differences observed in pain prevalence between hospice and non-hospice patients in nursing

facilities having higher hospice concentrations versus the larger differences seen in facilities with lower hospice concentrations.

In addition to being more likely to "see" a symptom, hospice staff is also more likely to treat the symptom. Patients in daily pain and enrolled in Medicare hospice are less likely to receive no analgesic and more likely to receive WHO level 3 analgesics. Also observed here is some evidence of a hospice influence on the nursing facility's treatment behavior, the "spill over" effect of hospice. The findings document that in facilities having a 9+ percent hospice concentration there are smaller differences in the receipt of level 3 analgesics between hospice and non-hospice patients than observed between hospice and non-hospice patients in facilities with concentrations of .01 to 9 percent.

Multivariate analyses support the hypothesis that hospice significantly influences the probability that a dying patient will receive regular treatment for pain management. Controlling for patient demographics, case mix, the presence of advance directives, state of nursing facility residence and the non-independence of patients residing in the same nursing facility, hospice enrollment is significantly associated with a 93 percent increased probability of having regular treatment for pain. This finding is in spite of the fact that there is a greater presence of documented pain for hospice patients that would tend to bias the findings toward the hypothesis of no difference. Also, this finding emerges in spite of the fact that we used a very gross measurement of treatment effect rather than dosage specific information which might have been more likely to detect a difference between hospice and non-hospice approaches to pain management. However, the low percentage of hospice and non-hospice patients (57 percent and 39 percent respectively) receiving regular treatment for daily pain is

a concern and this finding may be attributable to either care coordination or provision and/or to poor documentation of the MDS.

Given the literature documenting the inadequacy of pharmacological treatment for nursing facility residents (Bernabei et al., 1998; Ferrell, 1995; Wagner et al., 1996; Won et al., 1999), the finding of the significant hospice effect on pain management is not surprising. The study findings are consistent with the National Hospice Study findings that showed hospital-based hospice patients to be more likely to have consumed analgesics than were non-hospice patients (Goldberg et al., 1986). In addition, the findings are consistent with the viewpoints expressed by the informants interviewed for the literature review conducted in conjunction with this study (See Important Questions for Hospice in the Next Century of this study). Interviewed informants generally agreed that nursing facility residents receiving hospice care often had more comprehensive assessments and better symptom, pain, and psychosocial management than did terminally ill residents not receiving hospice services.

Whether the pain management findings reflect the effects of hospice on shorter stay nursing facility residents is unknown, as these findings are not generalizable to those patients with shorter lengths of stay who had to be excluded from this comparative study. Can hospice make a difference in symptom assessment and care management for patients with 2 or 3 day stays, or for other short stay patients? The length of hospice enrollment needed for a measurable hospice effect to be observed is an important question, and worthy of future research. A study now underway at the Gerontology Center at Brown University, and funded by the Retirement Research Foundation, will allow for study of patients with short as well as long lengths of hospice stay. This study should shed further light on the generalizability of the pain management findings found here.

Multivariate analyses do not support the hypothesis that hospice enrollment significantly influences the probability of a dying patient with persistent mood disturbance receiving antidepressant or antianxiety/hypnotic medication. With the small observed difference between hospice and non-hospice patients who receive treatment for persistent mood disturbance (a difference of 7 percent) there was not adequate power to test the hospice effect in this subanalysis of 1,129 hospice and non-hospice patients. The low percentage of hospice and non-hospice patients (50 percent and 43 percent respectively) receiving treatment is a concern and this finding may be attributable to either care coordination or practices and/or to poor documentation of the MDS.

Acute Care Hospital Utilization and Medicare Expenditures

It is clear from our analyses that Medicare hospice enrollment results in significant reductions in hospitalization and these reductions appear to extend to non-hospice patients in most study states. These reductions are a function of choice (both patient and nursing facility) and also a reflection of a nursing facility's capacity to meet the needs of dying patients within the facility. With hospice enrollment, it appears that the nursing facility's capacity to maintain patients in place increases. When staying in place is consonant with a patient's/family's wishes, then the ability to do so can positively influence a patient's quality of life at the end of life (Creditor, 1993), as well as save Medicare dollars.

For the 52 percent of hospice nursing facility patients with hospice stays of 30 days and less, hospice enrollment results in overall reductions in Medicare spending in the last 6 months of life. These savings, as well as the savings observed in the last month of life for all hospice enrollees, result in large part from the reductions in hospitalization, which accompany hospice enrollment. As hospice lengths of stay increase, however, it appears that

the savings due to reductions in hospitalization are not able to not totally offset the additional Medicare hospice expenditures. Therefore, in our unadjusted analyses, we do not observe reductions in total Medicare spending in the last 6 months of life for patients with hospice stays of greater than 30 days.

This study supports the hypothesis that hospice enrollment improves the quality of pain assessment and management at the end of life for nursing facility patients. Given these findings, we question how much time in hospice is required for these benefits to become actualized. Additionally, we question how much time in hospice is required for other benefits to become actualized, such as those benefits relating to the emotional and spiritual needs of dying patients and their families/significant others. Our assumption is that the longer the hospice enrollment the more likely benefits are to accrue, but we also know that longer hospice enrollments are more likely to increase total Medicare expenditures. What are the benefits versus the costs? We do not know the cost-benefit ratio and we do not know when short-stay patients can begin to benefit from hospice enrollment. As shown in this study, we do know that there is benefit to treating patients in nursing facilities for longer than 30 days.

Study Limitations

Several limitations to this study are noted. First, as discussed in the report Use of Medicare's Hospice Benefit by Nursing Facility Residents of this study, the results presented here are not necessarily generalizable to states other than Kansas, Maine, Mississippi, New York and South Dakota. Second, although the MDS assessments used for this study are data rich, 69 percent of the identified hospice patients did not have an MDS completed after hospice admission. The excluded hospice patients when compared to the included patients

had shorter hospice and nursing facility lengths of stay, were less likely to have dementia diagnoses, and had less ADL and cognitive impairment. The excluded patients also had a higher prevalence of pain, shortness of breath, and vomiting, and a lower prevalence of persistent mood disturbance than did the hospice patients included. Because of these differences, our findings are not generalizable to these short-stay patients.

The completion of the MDS resident assessment in nursing facilities is presently required within 7, 14, 30, and 60 days of nursing facility admission and quarterly thereafter. After the 60-day MDS, a new MDS is required each quarter. Also, when the patient has a significant change in condition and/or is discharged and readmitted to the nursing facility a new MDS is required (Health Care Financing Administration, 1999). Hospice election by a nursing facility resident may or may not be considered a significant change and thus may not trigger a new assessment. Additionally, when a significant change occurs, a new MDS is required within 14 days of the change (after 38 percent of the hospice episodes have been completed). As discussed in the report Important Questions for Hospice in the Next Century of this study, the need to incorporate hospice input and care plans into the MDS is an area that needs to be examined in considerable depth. To assure coordination of care between hospice and nursing facility providers, we recommend that completion of a new MDS upon hospice admission be required. However, there are important considerations in mandating such a requirement. First, for such a requirement to be useful in enhancing the care of most hospice patients the time requirement prescribed for completion should be shorter than the 14 days now required. Second, consideration should be given to using a shorter version of the assessment in lieu of the full comprehensive assessment form.

Our multivariate analyses did not control for patient or facility-level selection bias. Nursing facilities that choose to contract with hospices are probably different from those choosing not to contract with hospice. As such, these facilities may already have had lower hospitalization rates or superior symptom management practices than those facilities choosing not to contract with hospice.

On the other hand, when observing differences between hospice and non-hospice patients in nursing facilities having a hospice presence, the "spill-over" effects of hospice care provision may result in smaller observed differences between the two types of patients, masking the "pure" hospice effect on end of life care. In this study our comparison group represents patients in facilities with and without a hospice presence. For example, as shown on Table 14, only 807 (57 percent) of the non-hospice patients with daily pain reside in nursing facilities with some degree of hospice presence. Because of this mix of non-hospice patients the influence of facility selection bias should be less than if all non-hospice patients resided in nursing facilities with no hospice presence. Still, analyses and study design that control for facility selection bias as well as for the hospice influence on non-hospice patients would present the most unbiased results.

We also did not control for patient/family selection bias. However, only 54 percent of the non-hospice patients resided in nursing facilities having a hospice presence. The non-hospice patients residing in nursing facilities with no hospice presence could not choose hospice (without transfer to another facility/setting). Additionally, since most non-hospice patients were long-stay nursing facility residents it is unlikely that they or their families would have chosen a nursing facility based on the availability of hospice within the facility. Therefore, even though patient/family selection bias is present to some extent and it is an

important consideration for which we did not control, any introduced bias will be somewhat reduced due to differing access to hospice by our comparative cohort.

Patient/family selection bias is felt to be more important in terms of our hospitalization findings. This is considered to be the case since our symptom management outcomes simply measure whether treatment is being provided, and that shouldn't differ in relation to hospice preference. Had we examined dosage in relation to pain management, rather than regular management of pain, controlling for patient selection bias would have become more relevant. Patient/family selection bias for patients in nursing facilities may have less influence on hospitalization decisions than it has when patients reside in a private residence in the community, and this is probably most true for dying elderly nursing facility patients with no family members actively involved in their care. This speculation is supported somewhat by observing the effect of being married on the probability of being hospitalized and on the number of hospital days. Married nursing facility patients are significantly more likely to be hospitalized in the last 6 months of life and are significantly more likely to have a greater number of hospital days in the last 90 days of life, as well as the last 6 months of life.

We did not have a measure for the intensity of daily pain. Because of this we could not examine the hospice influence on the outcome of pain. Since our pain management outcome variable examined any analgesic treatment of pain, and not the WHO analgesic control ladder categories of analgesics, the lack of a pain intensity score should have little effect on these findings. We do acknowledge that some of the differences observed between hospice and non-hospice patients in the receipt of analgesics by WHO analgesic categories (Table 14) may be attributable to differences in pain intensity between hospice and non-

hospice patients. However, it is important to remember that 43 percent of the non-hospice patients in daily pain resided in nursing facilities with no hospice presence. Therefore, regardless of their level of pain or the difficulty of its management these patients would not have been referred to hospice (without transfer to another facility/setting). Consequently, any differences in pain intensity that may be present between hospice and non-hospice patients will be somewhat offset because 43 percent of the comparative cohort did not have the opportunity for referral to hospice. Last, most of the hospice and non-hospice patients in this study died approximately 30 days after the last MDS documenting their daily pain. Considering this, it is unlikely that their pain was of a benign nature.

Even considering the above limitations, our study findings appear valid in that they are largely in agreement or consistent with previous related research. Additionally, the pain management findings are in agreement with the viewpoints expressed by our informed interviewees. It is highly unlikely that the hospice effects observed in this study would disappear with the control for facility and patient/family selection bias.

CONCLUSION

The provision of Medicare hospice in nursing facilities appears to be a viable means to improve the quality of care for Medicare beneficiaries dying in nursing facilities. However, a great deal of concerted work on the part of the hospice and the nursing facility is needed to make this option work. Hospice enrollment is associated with an increased likelihood of adequate pain management for nursing facility patients, but still a high proportion of hospice nursing facility patients do not receive regular pharmacological treatment for pain. The barriers limiting the observance of greater hospice effects may include poor coordination between the hospice and the nursing facility staff, continued

resistance to hospice care philosophies by nursing facility staff and patient physicians, a lower quality of care provided by some hospice providers, and/or MDS assessments that do not fully reflect hospice input and care. Future research is needed to understand the reasons why even more improvement was not observed and, in this regard, research using other data sources is desirable. Still, the benefits of hospice involvement in nursing homes, at least for longer stay patients, are evident. Many findings, including the lower proportion of hospice patients receiving invasive treatments, support the notion that hospice patients may experience higher quality of life at the end of life. A major benefit in terms of quality of life is the reductions in hospitalizations observed for hospice patients in nursing facilities. In addition, some reductions in Medicare expenditures were observed for hospice patients in nursing facilities, and this benefit appears to extend to non-hospice patients. Whether the introduction of good end of life practices and related quality indicator monitoring in nursing facilities could achieve similar benefits as observed for hospice is unknown.

As with hospice provided in other settings, cumulative Medicare expenditures increase as the length of hospice stay increases. The cost benefit ratio clearly depends upon the duration of stay, although to what extent is unknown, and perhaps not totally measurable. Medicare expenditure comparisons reported in our study are gross. A hospice in nursing facility study that examines outcomes and costs, controls for facility and patient self-selection bias, and considers all Medicare and Medicaid expenditures is needed to achieve a more definitive answer. Also needed are demonstration studies of differing models of terminal care delivery in nursing facilities that compare patient outcomes as well as the costs of care provision.

REFERENCES

Bernabei, R.; Gambassi, G.; Lapane, K.; Landi, F.; Gatsonis, C.; Dunlop, R.; Lipsitz, L.; Steel, K., and Mor, V. Management of pain in elderly patients with cancer. SAGE Study Group. Systematic Assessment of Geriatric Drug Use via Epidemiology [see comments]. JAMA. 1998 Jun 17; 279(23):1877-82.

Creditor, M. C. Hazards of hospitalization of the elderly. Ann Intern Med. 1993 Feb 1; 118(3):219-23.

Desbiens, N. A.; Mueller Rizner, N.; Hamel, M. B., and Connors, A. F. Jr. Preference for comfort care does not affect the pain experience of seriously ill patients. The SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment. J Pain Symptom Manage. 1998 Nov; 16(5):281-9.

Ferrell, B. A. Pain evaluation and management in the nursing home. Ann Intern Med. 1995 Nov 1; 123(9):681-7.

Goldberg, R. J.; Mor, V.; Wiemann, M.; Greer, D. S., and Hiris, J. Analgesic use in terminal cancer patients: report from the National Hospice Study. J Chronic Dis. 1986; 39(1):37-45.

Health Care Financing Administration. Long Term Care Facility Resident Assessment Instrument (RAI) User's Manual. Natick, MA: Eliot Press; 1999.

Lamphere, J.; Holahan, D.; Brangan, N., and Burke, R. Reforming the Health Care System: State Profiles 1997. Washington, DC: Public Policy Institute of American Association of Retired Persons; 1997.

Lawton, M. and Brody, E. Assessment of older people: Self-maintaining and instrumental activities of daily living. The Gerontologist. 1969; 9179-186.

Levy, M. H. Pharmacologic treatment of cancer pain. The New England Journal of Medicine. 1996; 335:1124-1134.

Lynn, Joanne; Teno, Joan M.; Phillips, Russell S.; Wu, Albert W.; Desbiens, Norman; Harrold, Joan; Claessens, Michael T.; Wenger, Neil; Kreling, Barbara, and Connors Jr., Alfred F. for the SUPPORT Investigators. Perceptions by family members of the dying experience of older and seriously ill patients. Annals of Internal Medicine. 1997 Jan; 126:97-106.

Miller, S.C.; Gozalo, P.; Mor, V. Pain assessment and hospice care in nursing homes. The Gerontologist. 1999; 39, Special Issue 1:308-09.

Morris, J. N.; Fries, B. E.; Mehr, D. R.; Hawes, C.; Phillips, C.; Mor, V., and Lipsitz, L. A. MDS Cognitive Performance Scale. J Gerontol. 1994 Jul; 49(4):M174-82.

Morris, J.N.; Suissa, S.; Sherwood, S.; Wright, S.M.; Greer, D. Last days: A study of the quality of life of terminally ill cancer patients. Journal of Chronic Diseases. 1986; 39:47-62.

Oliver, C. Network relations and loss of organizational autonomy. Hum Relat. 1991; 44(9):943-961.

Pfeffer, J. and Salancik, G. R. The External Control of Organizations. New York: Harper & Row, Publishers; 1978.

Pritchard, R.S.; Fisher, E.S.; Teno, J.M.; Sharp, S.M.; Reding, D.J.; Knaus, W.A.; Wennberg, J.E.; Lynn, J. Influence of patient preferences and local health system characteristics on the place of death. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Risks and Outcomes of Treatment. J Am Geriatr Soc. 1998; 46(10):1242-50.

SAS Institute Inc. SAS/STAT Software: Changes and Enhancement through Release 6.12. ISBN 1-55544-873-9. Cary, NC: SAS Institute Inc; 1997.

Stjernsward, J. WHO cancer pain relief programme. Cancer Surv. 1988; 7:195-208.

Wachtel, T.; Allen Masterson, S.; Reuben, D.; Goldberg, R., and Mor, V. The end stage cancer patient: terminal common pathway. Hosp J. 1988; 4(4):43-80.

Wagner, A. M.; Goodwin, M.; Campbell, B.; Eskro, S.; French, S. A.; Shepherd, P. A., and Wade, M. Pain prevalence and pain treatments for residents in Oregon nursing homes. Geriatric Nursing. 1997; 18:268-272.

Wennberg, J., (Editor). The Dartmouth Atlas of Health Care in the United States. Chicago, IL: American Hospital Association; 1998.

Wong, G. Y. and Mason, W. M. Contextually specific effects and other generalizations of the hierarchical linear model for comparative analysis. J Am Stat Assoc. 1999; (86):487-503.

Zech, D. F.; Grond, S.; Lynch, J.; Hertel, D., and Lehmann, K. A. Validation of World Health Organization Guidelines for cancer pain relief: a 10-year prospective study. Pain. 1995 Oct; 63(1):65-76.

Table 1. Derivation of the Comparative Sample--Number of Patient Deletions and Remaining Patients

	Total 204,797		Non-Hospice 193,093		Hospice 11,704	
	Patients Deleted	**Remaining Patients**	**Patients Deleted**	**Remaining Patients**	**Patients Deleted**	**Remaining Patients**
Bad inpatient data (values < 0)	95	204,702	92	193,001	3	11,701
Bad home health data (values < 0)	8	204,694	8	192,993	0	11,701
Bad SNF data (values < 0)	14	204,680	14	192,979	0	11,701
Assessment date missing	0	204,680	0	192,979	0	11,701
Did not die	306	204,374	0	192,979	306	11,395
Hospice election after 1996	545	203,829	0	192,979	545	10,850
Hospice “pre” or “overlap”	2,384	201,445	0	192,979	2,384	8,466
MDS not after hospice election	5,811	195,634	0	192,979	5,811	2,655
Only 1 MDS	41,208	154,426	41,208	151,771	0	2,655
Only 1 with matching criteria – same state, diagnosis group and time from last MDS to death (completed within same number of weeks prior to death)	2,532	151,894	2,521	149,250	11	2,644
Hospice and non-hospice study cohorts and non-hospice decedents not selected for non-hospice cohort	141,321	10,573	141,321	7,929	0	2,644

Table 2. Length of Hospice Stay and Other Comparisons of Hospice Patients Included and Excluded from Comparative Analyses due to lack of MDS Assessment After Hospice Admission

	Included N=2,641 (100%)	Excluded N=5,749 (100%)
Length of Hospice Stay		
1-7	101 (3.8%)	2,143 (37.3%)
8-14	141 (5.3%)	1,093 (19.0%)
15-30	293 (11.1%)	1,041 (18.1%)
31-60	406 (15.4%)	744 (12.9%)
61-90	390 (14.8%)	331 (5.8%)
91-120	279 (10.6%)	129 (2.2%)
121-180	425 (16.1%)	117 (2.0%)
181-210	156 (5.9%)	44 (0.8%)
>210	450 (17.0%)	107 (1.9%)
Mean (days)	131.9	30.1
(SD)	(138.5)	(55.4)
Median	90	12
Mode	90	2
States		
Kansas	806 (30.5%)	1,333 (23.2%)
Maine	58 (2.2%)	168 (2.9%)
Mississippi	23 (0.9%)	293 (5.1%)
New York	1,630 (61.7%)	3,691 (64.2%)
South Dakota	124 (4.7%)	264 (4.6%)
Hospice Concentration*		
None	66 (2.5%)	291 (5.1%)
0-1.99	344 (13.0%)	1,305 (22.7%)
2-4.99	825 (31.2%)	1,760 (30.6%)
5-8.99	721 (27.3%)	1,209 (21.0%)
9-12.99	374 (14.2%)	644 (11.2%)
13+	311 (11.8%)	540 (9.4%)
Length of Current Nursing Home Stay (in months)		
<1	21 (0.9%)	371 (6.8%)
1-<3	122 (5.5%)	765 (14.0%)
3-<6	246 (11.1%)	776 (14.2%)
6-<12	431 (19.5%)	948 (17.3%)
12-<24	551 (24.9%)	1,217 (22.2%)
24+	844 (38.1%)	1,397 (25.5%)
Mean (days)	611.4	461.8
(SD)	(421.6)	(411.1)
Median	530	331
Mode	207	36

***This comparison uses the last MDS assessment prior to hospice admission.**

Table 3. Demographic and Clinical Comparisons of Hospice Patients Included and Excluded from Comparative Analyses--Hospice Residents Excluded due to Lack of MDS Assessment after Hospice Admission

	Included N=2,641 (100%)	Excluded N=5,749 (100%)
Age*		
Up to 65	67 (2.6%)	142 (2.5%)
65-74	323 (12.2%)	835 (14.5%)
75-84	893 (33.8%)	2,148 (37.4%)
85 or older	1,358 (51.4%)	2,624 (45.6%)
Gender*		
Female	1,938 (73.4%)	3,862 (67.2%)
Male	703 (26.6%)	1,887 (32.8%)
Race / Ethnicity*		
Native American	2 (0.08%)	3 (0.05%)
Asian	1 (0.04%)	5 (0.09%)
Black	97 (3.7%)	246 (4.3%)
Hispanic	3 (0.1%)	8 (0.1%)
White	2,513 (95.1%)	5,418 (94.2%)
Other	4 (0.1%)	28 (0.5%)
Unknown	21 (0.8%)	41 (0.7%)
Marital Status**		
Never Married	206 (8.0%)	448 (8.0%)
Married	512 (20.0%)	1,448 (25.7%)
Widowed	1,690 (65.8%)	3,405 (60.5%)
Separated	24 (0.9%)	60 (1.1%)
Divorced	135 (5.3%)	263 (4.7%)
ADL**		
Minimal Oversight	61 (2.3%)	143 (2.5%)
Extensive Oversight	177 (6.8%)	361 (6.4%)
Limited Assistance	422 (16.1%)	930 (16.3%)
Extensive Assistance	594 (22.7%)	1,402 (24.7%)
Dependent	706 (27.0%)	1,498 (26.4%)
Highly Dependent	657 (25.1%)	1,346 (23.7%)
CPS**		
Intact	459 (17.5%)	1,251 (22.0%)
Borderline Intact	371 (14.2%)	854 (15.0%)
Mild Impairment	357 (13.6%)	738 (13.0%)
Moderately Impairment	611 (23.4%)	1,124 (19.8%)
Moderately Severe Impairment	212 (8.1%)	497 (8.8%)
Severe Impairment	193 (7.4%)	388 (6.8%)
Very Severe Impairment	414 (15.8%)	830 (14.6%)
Symptoms**		
Pain	562 (21.9%)	1,347 (23.9%)
Shortness of Breath	315 (12.2%)	826 (14.7%)
Vomiting	125 (4.9%)	309 (5.5%)
Persistent Mood Disturbance	362 (13.8%)	724 (12.8%)

***From HCFA denominator file.**

****These comparisons use the last MDS assessment prior to hospice admission.**

Table 3. (Continued) Demographic and Clinical Comparisons of Hospice Patients Included and Excluded from Comparative Analyses. Hospice Residents Excluded due to Lack of MDS Assessment after Hospice Admission

	Included N=2,641 (100%)	Excluded N=5,749 (100%)
Body Mass Index**		
Low (<19)	366 (29.3%)	1,017 (28.9%)
Adequate (19-24.99)	604 (48.3%)	1,654 (47.1%)
High (25+)	281 (22.4%)	842 (24.0%)
Diagnosis		
Cancer, no Dementia	723 (27.4%)	1,729 (30.1%)
Cancer with Dementia	891 (33.7%)	1,757 (30.6%)
Dementia	455 (17.2%)	785 (13.6%)
Other	572 (21.7%)	1,478 (25.7%)

****This comparison uses the last MDS assessment prior to hospice admission.**

Table 4. Comparative Descriptive Statistics-Hospice and Non-Hospice Decedents

	Hospice N=2,644 (100%)	Non-Hospice N=7,929 (100%)
Age*		
Up to 65	66 (2.5%)	161 (2.0%)
65-74	305 (11.6%)	750 (9.5%)
75-84	858 (32.4%)	2,514 (31.7%)
85 or older	1,415 (53.5%)	4,504 (56.8%)
Gender*		
Female	1,939 (73.3%)	5,042 (63.6%)
Male	705 (26.7%)	2,887 (36.4%)
Race / Ethnicity*		
Native American	2 (0.08%)	0 (0.0%)
Asian	1 (0.04%)	12 (0.1%)
Black	97 (3.7%)	467 (5.9%)
Hispanic	3 (0.1%)	20 (0.3%)
White	2,516 (95.2%)	7,311 (92.2%)
Other	21 (0.8%)	60 (0.8%)
Unknown	4 (0.2%)	59 (0.7%)
Marital Status**		
Never Married	214 (8.1%)	939 (12.2%)
Married	517 (19.7%)	1,507 (19.6%)
Widowed	1,747 (66.4%)	4,812 (62.6%)
Separated	19 (0.7%)	92 (1.2%)
Divorced	134 (5.1%)	340 (4.4%)
ADL**		
Minimal Oversight	10 (0.4%)	84 (1.1%)
Extensive Oversight	40 (1.5%)	366 (4.7%)
Limited Assistance	171 (6.6%)	774 (9.8%)
Extensive Assistance	426 (16.3%)	1,414 (18.0%)
Dependent	838 (32.0%)	2,429 (31.0%)
Highly Dependent	1,131 (43.2%)	2,780 (35.4%)
CPS**		
Intact	267 (10.3%)	901 (11.5%)
Borderline Intact	265 (10.3%)	912 (11.6%)
Mild Impairment	282 (10.9%)	884 (11.3%)
Moderately Impairment	611 (23.6%)	1,852 (23.6%)
Moderately Severe Impairment	283 (10.9%)	753 (9.6%)
Severe Impairment	200 (7.7%)	746 (9.5%)
Very Severe Impairment	679 (26.3%)	1,792 (22.9%)
Vomiting**	174 (6.7%)	383 (5.0%)
Body Mass Index**		
Low (<19)	409 (37.5%)	1,130 (31.2%)
Adequate (19-24.99)	495 (45.3%)	1,712 (47.3%)
High (25+)	188 (17.2%)	779 (21.5%)

***From HCFA denominator file.**
****From last MDS prior to death.**

Table 4. (Continued) Comparative Descriptive Statistics-Hospice and Non-Hospice Decedents

	Hospice N=2,644 (100%)	Non-Hospice N=7,929 (100%)
Advanced Directives**		
Do not Resuscitate	1,633 (86.8%)	3,508 (62.7%)
Do not Hospitalize	207 (11.0%)	137 (2.5%)
Feeding Restrictions	296 (15.7%)	422 (7.5%)
Medication Restrictions	70 (3.7%)	105 (1.9%)
Other Treatment Restrictions	266 (14.1%)	347 (6.2%)

***From HCFA denominator file.**
****From last MDS prior to death.**

Table 5. The Number and Proportion* of Hospice and Non-Hospice Patients with Daily Pain at Ultimate Assessment Prior to Death-All States*

Hospice Concentration	HOSPICE (N=2,594)				NON-HOSPICE (N=7,636)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=709	Dementia N=884	N=448	N=553	No Dementia N=2,073	Dementia N=2,626	N=1,340	N=1,597
None	5 (55.6%)	0 (0.0%)	0 (0.0%)	2 (66.7%)	282 (29.7%)	177 (15.6%)	44 (6.9%)	98 (13.6%)
0.01-1.99	67 (54.9%)	26 (35.1%)	3 (16.7%)	8 (20.5%)	192 (31.6%)	129 (15.1%)	38 (9.5%)	72 (15.1%)
2-4.99	146 (47.2%)	70 (28.5%)	14 (19.4%)	54 (32.1%)	114 (32.4%)	65 (16.5%)	19 (10.6%)	51 (19.8%)
5-8.99	72 (44.2%)	62 (23.0%)	22 (16.8%)	37 (27.0%)	44 (37.3%)	18 (12.9%)	12 (14.6%)	19 (18.8%)
9-12.99	20 (36.4%)	34 (21.3%)	23 (20.2%)	25 (22.9%)	6 (19.6%)	7 (15.6%)	4 (12.5%)	4 (13.8%)
13+	20 (39.2%)	34 (26.0%)	14 (12.7%)	21 (21.6%)	3 21.4%)	5 (19.2%)	1 (8.3%)	4 (36.4%)
All Patients	330 (46.5%)	226 (25.6%)	76 (17.0%)	147 (26.6%)	641 (30.9%)	401 (15.3%)	118 (8.8%)	248 (15.5%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 6. The Number and Proportion* of Hospice and Non-Hospice Patients with Daily Pain at Ultimate Assessment Prior to Death-Pain Present on Penultimate MDS

Hospice Concentration	HOSPICE (N=570)				NON-HOSPICE (N=1,045)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=262	Dementia N=158	N=46	N=104	No Dementia N=486	Dementia N=275	N=81	N=203
None	1 (25.0%)	0 (0.0%)	0 (0.0%)	1 (100%)	161 (76.7%)	85 (68.6%)	20 (66.7%)	53 (64.6%)
0.01-1.99	46 (80.7%)	10 (90.9%)	2 (50.0%)	4 (44.4%)	103 (75.2%)	52 (65.8%)	11 (61.1%)	31 (60.8%)
2-4.99	91 (75.2%)	35 (74.5%)	10 (83.3%)	28 (62.2%)	77 (81.1%)	34 (70.8%)	10 (71.4%)	31 (64.6%)
5-8.99	39 (76.5%)	37 (64.9%)	8 (57.1%)	16 (66.7%)	25 (64.1%)	7 (46.7%)	8 (61.5%)	10 (58.8%)
9-12.99	12 (85.7%)	12 (63.2%)	6 (75.0%)	9 (90.0%)	2 (66.7%)	4 (66.7%)	4 (80.0%)	1 (100%)
13+	10 (66.7%)	15 (65.2%)	3 (42.9%)	8 (53.3%)	1 (50.0%)*	2 (66.7%)	1 (100%)	4 (100%)
All Patients	199 (75.9%)	109 (69.0%)	29 (63.1%)	66 (63.5%)	369 (75.9%)	184 (66.9%)	54 (66.7%)	130 (64.1%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 7. The Number and Proportion* of Hospice and Non-Hospice Patients with Daily Pain at Ultimate Assessment Prior to Death-Pain Absent on Penultimate MDS

Hospice Concentration	HOSPICE (N=1,982)				NON-HOSPICE (N=6,392)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=430	Dementia N=717	N=394	N=441	No Dementia N=1,529	Dementia N=2,293	N=1,233	N=1,337
None	3 (75.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	112 (15.8%)	83 (8.2%)	23 (3.9%)	39 (6.4%)
0.01-1.99	19 (31.1%)	16 (26.2%)	1 (7.7%)	3 (10.3%)	87 (19.0%)	74 (9.7%)	26 (6.9%)	36 (8.7%)
2-4.99	52 (28.7%)	35 (17.8%)	4 (6.8%)	23 (19.2%)	36 (14.5%)	31 (9.2%)	9 (5.5%)	20 (9.8%)
5-8.99	32 (29.1%)	24 (11.4%)	13 (11.6%)	21 (19.1%)	17 (22.4%)	10 (8.5%)	4 (5.8%)	6 (7.5%)
9-12.99	8 (19.5%)	21 (15.1%)	16 (15.2%)	16 (16.2%)	3 (11.5%)	3 (7.7%)	0 (0.0%)	3 (11.1%)
13+	7 (21.2%)	19 (17.6%)	11 (10.7%)	13 (16.1%)	2 (16.7%)	3 (13.1%)	0 (0.0%)	0 (0.0%)
All Patients	121 (28.1%)	115 (16.0%)	45 (11.4%)	77 (17.5%)	257 (16.8%)	204 (8.9%)	62 (5.0%)	104 (7.8%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 8. The Number and Proportion* of Hospice and Non-Hospice Patients with Dyspnea at Ultimate Assessment Prior to Death

Hospice Concentration	HOSPICE (N=2,599)				NON-HOSPICE (N=7,642)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=709	Dementia N=885	N=450	N=555	No Dementia N=2,074	Dementia N=2,630	N=1,341	N=1,597
None	3 (33.3%)	0 (0.0%)	0 (0.0%)	1 (33.3%)	163 (17.1%)	104 (8.9%)	44 (6.9%)	90 (12.5%)
0.01-1.99	27 (22.1%)	8 (10.8%)	1 (5.6%)	12 (30.8%)	110 (18.1%)	67 (7.8%)	31 (7.7%)	82 (17.2%)
2-4.99	49 (15.9%)	31 (12.5%)	5 (6.9%)	43 (25.3%)	66 (18.8%)	43 (11.0%)	12 (6.7%)	37 (14.3%)
5-8.99	27 (16.6%)	42 (15.6%)	15 (11.4%)	37 (27.0%)	29 (24.6%)	18 (13.0%)	6 (7.3%)	15 (14.9%)
9-12.99	14 (25.5%)	18 (11.2%)	10 (8.8%)	24 (22.0%)	7 (22.6%)	6 (13.3%)	3 (9.4%)	6 (20.7%)
13+	12 (23.5%)	13 (9.9%)	3 (2.7%)	20 (20.6%)	5 (35.7%)	2 (7.7%)	0 (0.0%)	2 (18.2%)
All Patients	132 (18.6%)	112 (12.7%)	34 (7.6%)	137 (24.7%)	380 (18.3%)	240 (9.1%)	96 (7.2%)	232 (14.5%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 9. The Number and Proportion* of Hospice and Non-Hospice Patients with Dyspnea at Ultimate Assessment Prior to Death-All States-Dyspnea Present on Penultimate MDS

Hospice Concentration	HOSPICE (N=308)				NON-HOSPICE (N=615)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=101	Dementia N=64	N=21	N=122	No Dementia N=278	Dementia N=121	N=52	N=164
None	2 (100%)	0 (0.0%)	0 (0.0%)	1 (100%)	88 (77.2%)	35 (67.3%)	15 (71.4%)	45 (68.2%)
0.01-1.99	15 (65.2%)	3 (42.9%)	0 (0.0%)	7 (63.6%)	63 (79.8%)	20 (71.4%)	14 (73.7%)	37 (84.1%)
2-4.99	23 (62.2%)	12 (70.6%)	1 (20.0%)	29 (64.4%)	39 (66.1%)	13 (54.2%)	4 (66.7%)	20 (64.5%)
5-8.99	15 (65.2%)	19 (95.0%)	5 (62.5%)	21 (72.4%)	15 (75.0%)	6 (54.6%)	2 (66.7%)	11 (78.6%)
9-12.99	5 (62.5%)	7 (58.3%)	2 (66.7%)	14 (70.0%)	2 (100%)	2 (40.0%)	2 (66.7%)	4 (66.7%)
13+	5 (62.5%)	5 (62.5%)	2 (50.0%)	12 (75.0%)	4 (100%)	0 (0.0%)	0 (0.0%)	2 (66.7%)
All Patients	65 (64.4%)	46 (71.9%)	10 (47.6%)	84 (68.8%)	211 (75.9%)	76 (62.8%)	37 (71.1%)	119 (72.6%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 10. The Number and Proportion* of Hospice and Non-Hospice Patients with Dyspnea at Ultimate Assessment Prior to Death-All-States-Dyspnea Absent on Penultimate MDS

Hospice Concentration	HOSPICE (N=2,249)				NON-HOSPICE (N=6,828)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=591	Dementia N=812	N=421	N=425	No Dementia N=1,738	Dementia N=2,451	N=1,263	N=1,376
None	1 (16.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	64 (7.9%)	65 (6.0%)	26 (4.4%)	41 (6.6%)
0.01-1.99	12 (12.6%)	4 (6.1%)	1 (5.9%)	4 (14.8%)	44 (8.5%)	43 (5.3%)	17 (4.5%)	39 (9.3%)
2-4.99	26 (9.8%)	18 (7.9%)	4 (6.1%)	12 (9.8%)	27 (9.5%)	30 (8.3%)	8 (4.6%)	16 (7.2%)
5-8.99	12 (8.7%)	23 (9.3%)	9 (7.6%)	15 (14.3%)	11 (11.6%)	12 (9.8%)	4 (5.1%)	3 (3.6%)
9-12.99	9 (19.1%)	10 (6.9%)	8 (7.3%)	10 (11.2%)	4 (14.8%)	4 (10.0%)	1 (3.5%)	1 (4.6%)
13+	6 (15.0%)	8 (6.5%)	1 (1.0%)	8 (10.0%)	1 (10.0%)	2 (8.0%)	0 (0.0%)	0 (0.0%)
All Patients	66 (11.2%)	63 (7.8%)	23 (5.5%)	49 (11.5%)	151 (8.7%)	156 (6.4%)	56 (4.4%)	100 (7.3%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 11. The Number and Proportion* of Hospice and Non-Hospice Patients with Persistent Mood Disturbance at Ultimate Assessment Prior to Death-All States

Hospice Concentration	HOSPICE (N=2,597)				NON-HOSPICE (N=7,811)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=713	Dementia N=880	N=446	N=558	No Dementia N=2,137	Dementia N=2,642	N=1,345	N=1,687
None	0 (0.0%)	0 (0.0%)	2 (66.7%)	0 (0.0%)	155 (15.6%)	138 (11.7%)	74 (11.6%)	89 (11.6%)
0.01-1.99	28 (22.6%)	13 (17.6%)	2 (11.76%)	12 (30.8%)	93 (14.8%)	91 (10.6%)	37 (9.2%)	68 (13.9%)
2-4.99	57 (18.4%)	28 (11.5%)	10 (14.1%)	47 (27.8%)	67 (19.1%)	55 (14.0%)	22 (12.2%)	31 (11.4%)
5-8.99	24 (14.7%)	39 (14.5%)	15 (11.5%)	25 (18.1%)	19 (16.5%)	19 (13.5%)	6 (7.5%)	12 (12.1%)
9-12.99	10 (17.9%)	12 (7.4%)	12 (10.4%)	20 (17.9%)	4 (12.9%)	4 (9.1%)	6 (18.8%)	6 (20.0%)
13+	12 (23.5%)	9 (6.9%)	10 (9.1%)	12 (12.4%)	3 (21.4%)	3 (11.5%)	1 (8.3%)	2 (18.2%)
All Patients	131 (18.4%)	101 (11.5%)	51 (11.4%)	116 (20.8%)	341 (16.0%)	310 (11.7%)	146 (10.9%)	208 (12.3%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 12. The Number and Proportion* of Hospice and Non-Hospice Patients with Persistent Mood Disturbance at Ultimate Assessment Prior to Death-All States-Persistent Mood Disturbance Present on Penultimate MDS

Hospice Concentration	HOSPICE (N=338)				NON-HOSPICE (N=768)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=88	Dementia N=102	N=53	N=95	No Dementia N=229	Dementia N=260	N=125	N=154
None	0 (0.0%)	0 (0.0%)	1 (100%)	0 (0.0%)	75 (69.4%)	83 (75.5%)	54 (79.4%)	41 (64.1%)
0.01-1.99	17 (68.0%)	7 (63.6%)	2 (50.0%)	7 (70.0%)	45 (76.3%)	59 (74.7%)	19 (73.1%)	32 (69.6%)
2-4.99	31 (77.5%)	18 (72.0%)	5 (50.0%)	25 (71.4%)	33 (80.5%)	31 (86.1%)	13 (72.2%)	17 (58.6%)
5-8.99	9 (75.0%)	28 (66.7%)	9 (56.3%)	16 (84.2%)	12 (75.0%)	14 (66.7%)	4 (57.1%)	6 (66.7%)
9-12.99	3 (75.0%)	8 (66.7%)	6 (54.6%)	14 (73.7%)	2 (66.7%)	2 (50.0%)	4 (80.0%)	4 (100%)
13+	6 (85.7%)	9 (75.0%)	8 (72.7%)	7 (58.3%)	2 (100%)	3 (75.0%)	1 (100%)	2 (100%)
All Patients	66 (75.0%)	70 (68.6%)	31 (58.5%)	69 (72.6%)	169 (73.8%)	192 (73.8%)	95 (76.0%)	102 (66.2%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 13. The Number and Proportion* of Hospice and Non-Hospice Patients with Persistent Mood Disturbance at Ultimate Assessment Prior to Death-All States-Persistent Mood Disturbance Absent on Penultimate MDS

Hospice Concentration	HOSPICE (N=2,245)				NON-HOSPICE (N=7,027)			
	Cancer		Dementia	Other	Cancer		Dementia	Other
	No Dementia N=617	Dementia N=777	N=390	N=461	No Dementia N=1,901	Dementia N=2,378	N=1,219	N=1,529
None	0 (0.0%)	0 (0.0%)	1 (50.0%)	0 (0.0%)	79 (8.9%)	55 (5.2%)	20 (3.51%)	48 (6.7%)
0.01-1.99	11 (11.5%)	6 (9.5%)	0 (0.0%)	5 (17.2%)	48 (8.5%)	32 (4.1%)	18 (4.8%)	36 (8.1%)
2-4.99	25 (9.4%)	10 (4.6%)	3 (5.1%)	22 (16.4%)	34 (11.0%)	23 (6.5%)	9 (5.6%)	14 (5.8%)
5-8.99	14 (9.3%)	10 (4.4%)	6 (5.3%)	9 (7.7%)	7 (7.1%)	5 (4.2%)	2 (2.7%)	5 (5.6%)
9-12.99	7 (13.5%)	4 (2.7%)	6 (5.8%)	6 (6.5%)	2 (7.1%)	1 (2.6%)	2 (7.4%)	2 (7.7%)
13+	6 (13.9%)	0 (0.0%)	2 (2.0%)	5 (5.9%)	1 (8.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
All Patients	63 (10.2%)	30 (3.9%)	18 (4.6%)	47 (10.2%)	171 (9.0%)	116 (4.9%)	51 (4.2%)	105 (6.9%)

***Number equals persons who are characterized by the cell and who have the symptom documented as present. The proportion represents these patients divided by the total patients characterized by the cell. Note-The total number of patients characterized by each cell is not given.**

Table 14. Analgesic Level Consumed by Hospice Concentration in Nursing Homes
All Patients with Daily Pain Present

		HOSPICE CONCENTRATION IN NURSING HOMES					
	All Patients	**None**	**0.01-1.99**	**2-4.99**	**5-8.99**	**9-12.99**	**13+**
HOSPICE (N=712*)							
None	108 (15.2%)	4 (57.1%)	14 (14.3%)	39 (14.6%)	21 (11.8%)	18 (20.2%)	12 (16.4%)
WHOI	104 (14.6%)	0 (0.0%)	10 (10.2%)	37 (13.9%)	23 (12.9%)	20 (22.5%)	14 (19.2%)
WHOII	152 (21.3%)	1 (14.3%)	24 (24.5%)	49 (18.3%)	45 (25.3%)	18 (20.2%)	15 (20.6%)
WHOIII	348 (48.9%)	2 (28.6%)	50 (51.0%)	142 (53.2%)	89 (50.0%)	33 (37.1%)	32 (43.8%)
NON-HOSPICE (N=1331*)							
None	307 (23.1%)	146 (25.1%)	87 (21.7%)	44 (18.6%)	22 (26.5%)	6 (30.0%)	2 (20.0%)
WHOI	274 (20.6%)	124 (21.4%)	81 (20.2%)	51 (21.5%)	11 (13.3%)	4 (20.0%)	3 (30.0%)
WHOII	428 (32.1%)	186 (32.1%)	135 (33.7%)	74 (31.2%)	26 (31.3%)	4 (20.0%)	3 (30.0%)
WHOIII	322 (24.2%)	124 (21.4%)	98 (24.4%)	68 (28.7%)	24 (28.9%)	6 (30.0%)	2 (20.0%)

***67 hospice patients and 77 non-hospice patients in daily pain excluded from this table since drug data not available for these patients.**

Table 15. Special Treatments by Resident Demographics – Hospice Patients*

	SPECIAL TREATMENTS							
						THERAPIES		
	Use of Restraints	Feeding Tubes	Parenteral/IV Feedings	IM Medications	IV Medications	Occupational	Speech	Physical
Gender								
Male (N=696)	96 (13.8%)	65 (9.4%)	10 (1.4%)	3 (1.0%)	37 (5.3%)	24 (3.5%)	6 (0.9%)	68 (9.8%)
Female (N=1931)	166 (8.6%)	123 (6.5%)	22 (1.2%)	11 (1.3%)	59 (3.1%)	55 (2.9%)	15 (0.8%)	133 (6.9%)
Race/Ethnicity								
White (N=2,499)	251 (10.1%)	166 (6.7%)	28 (1.1%)	14 (1.3%)	90 (3.6%)	74 (3.0%)	20 (0.8%)	188 (7.5%)
African American (N=97)	8 (8.3%)	19 (19.6%)	3 (3.1%)	0 (0.0%)	5 (5.1%)	4 (4.1%)	1 (1.0%)	11 (11.3%)
Hispanic (N=3)	1 (33.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (33.3%)	0 (0.0%)	0 (0.0%)
Other (N=7)	1 (14.3%)	1 (14.3%)	1 (14.3%)	0 (0.0%)	1 (14.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unknown (N=21)	1 (4.8%)	2 (9.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (9.5%)
Age Group								
<65 (N=66)	11 (16.7%)	12 (18.2%)	0 (0.0%)	1 (3.1%)	2 (3.0%)	4 (6.1%)	0 (0.0%)	8 (12.1%)
65-74 (N=300)	29 (9.7%)	25 (8.4%)	6 (2.0%)	0 (0.0%)	20 (6.7%)	15 (5.0%)	2 (0.7%)	28 (9.3%)
75-84 (N=854)	93 (10.9%)	71 (8.5%)	13 (1.5%)	5 (1.2%)	40 (4.7%)	29 (3.4%)	7 (0.8%)	73 (8.6%)
85+ (N=1,407)	129 (9.2%)	80 (5.8%)	13 (0.9%)	8 (1.5%)	34 (2.4%)	31 (2.2%)	12 (0.9%)	92 (6.5%)
All Hospice Patients (N=2,627)	262 (10.0%)	188 (7.2%)	32 (1.2%)	14 (1.2%)	96 (3.7%)	79 (3.0%)	21 (0.8%)	201 (7.6%)

***The denominator for the percents may not equal the N shown due to missing values for some of the treatment variables.**

Table 16. Special Treatments by Resident Demographics – Non-Hospice Patients*

	SPECIAL TREATMENTS							
						THERAPIES		
	Use of Restraints	Feeding Tubes	Parenteral/IV Feedings	IM Medications	IV Medications	Occupational	Speech	Physical
Gender								
Male (N=2,871)	429 (14.9%)	283 (10.2%)	51 (1.8%)	22 (2.3%)	186 (6.5%)	200 (7.0%)	63 (2.2%)	508 (17.7%)
Female (N=5,021)	736 (14.7%)	568 (11.7%)	92 (1.9%)	37 (2.2%)	268 (5.3%)	329 (6.6%)	69 (1.4%)	739 (14.7%)
Race/Ethnicity								
White (N=7,274)	1,082 (14.9%)	688 (9.8%)	131 (1.9%)	57 (2.3%)	418 (5.8%)	476 (6.6%)	120 (1.7%)	1147 (15.8%)
African American (N=467)	66 (14.3%)	139 (29.9%)	9 (1.9%)	2 (1.7%)	25 (5.6%)	34 (7.3%)	10 (2.1%)	68 (14.6%)
Hispanic (N=20)	2 (10.0%)	3 (15.0%)	0 (0.0%)	0 (0.0%)	1 (5.0%)	1 (5.0%)	1 (5.0%)	2 (10.0%)
Other (N=71)	8 (11.3%)	14 (19.8%)	2 (2.8%)	0 (0.0%)	6 (8.5%)	13 (18.3%)	0 (0.0%)	13 (18.3%)
Unknown (N=60)	7 (11.7%)	7 (11.7%)	1 (1.7%)	0 (0.0%)	4 (6.7%)	5 (8.3%)	1 (1.7%)	17 (28.3%)
Age Group								
<65 (N=161)	19 (11.8%)	33 (21.0%)	1 (0.7%)	0 (0.0%)	20 (12.4%)	16 (10.0%)	0 (0.0)%	27 (16.9%)
65-74 (N=745)	92 (12.4%)	102 (13.9%)	18 (2.5%)	6 (2.2%)	56 (7.5%)	81 (10.9%)	14 (1.9%)	154 (20.7%)
75-84 (N=2,500)	383 (15.3%)	304 (12.6%)	42 (1.7%)	25 (2.9%)	155 (6.2%)	193 (7.7%)	49 (2.0%)	468 (18.7%)
85+ (N=4,486)	671 (15.0%)	412 (9.5%)	82 (1.9%)	28 (1.9%)	233 (5.0%)	239 (5.3%)	69 (1.5%)	598 (13.4%)
All Non-Hospice Patients (N=7,892)	1165 (14.8%)	851 (11.1%)	143 (1.9%)	59 (2.2%)	454 (5.8%)	529 (6.7%)	132 (1.7%)	1,247 (15.8%)

***The denominator for the percents may not equal the N shown due to missing values for some of the treatment variables.**

Table 17. Hospital Use* by Hospice Enrollment Status at Time of Death, 1992-1996

	TIME PRIOR TO DEATH		
	30 Days	**90 Days**	**6 Months**
NEW YORK			
Hospice (N=1,632)			
N(%) hospitalized	159 (9.7%)	285 (17.5%)	516 (31.6%)
Average hospital days (SD)	0.94 (3.46)	2.84 (8.17)	6.44 (13.66)
Non-Hospice (N=4,896)			
N(%) hospitalized	2,028 (41.4%)	2,523 (51.5%)	2,926 (59.8%)
Average hospital days (SD)	4.94 (7.95)	9.94 (15.34)	15.53 (22.67)
MAINE			
Hospice (N=58)			
N(%) hospitalized	7 (12.1%)	17 (29.3%)	25 (43.1%)
Average hospital days (SD)	1.03 (3.15)	3.15 (6.05)	6.88 (12.10)
Non-Hospice (N=174)			
N(%) hospitalized	38 (21.9%)	71 (40.8%)	92 (52.9%)
Average hospital days (SD)	2.04 (5.03)	5.36 (9.43)	9.91 (15.31)
KANSAS			
Hospice (N=807)			
N(%) hospitalized	134 (16.6%)	285 (35.3%)	427 (52.9%)
Average hospital days	1.40 (3.78)	4.12 (7.85)	7.97 (11.53)
Non-Hospice (N=2,420)			
N(%) hospitalized	1,013 (41.9%)	1,362 (56.3%)	1,554 (64.2%)
Average hospital days (SD)	3.45 (5.40)	6.97 (9.45)	9.91 (13.08)
MISSISSIPPI			
Hospice (N=23)			
N(%) hospitalized	8 (34.8%)	13 (56.2%)	15 (65.2%)
Average hospital days (SD)	1.56 (3.17)	6.83 (8.46)	13.04 (14.52)
Non-Hospice (N=67)			
N(%) hospitalized	44 (65.7%)	53 (79.1%)	56 (83.6%)
Average hospital days (SD)	6.82 (6.97)	11.87 (12.18)	15.94 (15.32)
SOUTH DAKOTA			
Hospice (N=124)			
N(%) hospitalized	23 (18.6%)	48 (38.7%)	69 (55.6%)
Average hospital days (SD)	1.24 (3.09)	4.47 (7.55)	7.86 (10.22)
Non-Hospice (N=372)			
N(%) hospitalized	152 (40.9%)	222 (59.7%)	255 (68.5%)
Average hospital days (SD)	3.24 (5.01)	6.80 (8.74)	10.25 (11.88)
ALL STATES			
Hospice (N=2,644)			
N(%) hospitalized	331 (12.5%)	648 (24.5%)	1,052 (39.8%)
Average hospital days (SD)	1.1 (3.5)	3.3 (8.03)	7.0 (12.9)
Non-Hospice (N=7,929)			
N(%) hospitalized	3,275 (41.3%)	4,231 (53.3%)	4,883 (61.6%)
Average hospital days (SD)	4.4 (7.12)	8.8 (13.5)	13.4 (19.8)

***Inpatient acute care from Medicare Inpatient claims.**
SD = standard deviation

Table 18. Hospital Use* by Hospice Enrollment Status at Time of Death
Hospice Patients Receiving Hospice Benefit the Entire Last 30 Days of Life (and the matched non-hospice patients)
1992-1996

	TIME PRIOR TO DEATH		
	30 Days	**90 Days**	**6 Months**
NEW YORK			
Hospice (N=1,070)			
N(%) hospitalized	15 (1.4%)	109 (10.2%)	284 (26.5%)
Average hospital days (SD)	0.13 (1.3)	1.43 (5.4)	5.09 (11.9)
Non-Hospice (N=3,210)			
N(%) hospitalized	1,264 (39.4%)	1,597 (49.8%)	1,868 (58.2%)
Average hospital days (SD)	4.77 (8.0)	9.45 (15.0)	14.90 (22.2)
MAINE			
Hospice (N=29)			
N(%) hospitalized	0 (0.0%)	3 (10.3%)	7 (24.1%)
Average hospital days (SD)	0 (0)	0.55 (1.8)	2.17 (4.9)
Non-Hospice (N=87)			
N(%) hospitalized	21 (24.1%)	39 (44.8%)	51 (58.6%)
Average hospital days (SD)	2.07 (5.1)	5.47 (8.9)	10.59 (15.7)
KANSAS			
Hospice (N=474)			
N(%) hospitalized	13 (2.7%)	96 (20.3%)	205 (43.3%)
Average hospital days	0.18 (1.3)	1.99 (4.8)	5.90 (9.4)
Non-Hospice (N=1,422)			
N(%) hospitalized	548 (38.5%)	765 (53.8%)	883 (62.1%)
Average hospital days (SD)	3.10 (5.2)	6.60 (9.2)	9.80 (13.2)
MISSISSIPPI			
Hospice (N=10)			
N(%) hospitalized	2 (20.0%)	4 (40.0%)	6 (60.0%)
Average hospital days (SD)	0.90 (1.9)	4.50 (8.4)	8.30 (10.1)
Non-Hospice (N=30)			
N(%) hospitalized	21 (70.0%)	23 (76.7%)	25 (83.3%)
Average hospital days (SD)	8.60 (8.2)	13.00 (11.0)	17.20 (15.7)
SOUTH DAKOTA			
Hospice (N=65)			
N(%) hospitalized	0 (0.0%)	16 (24.6%)	29 (44.6%)
Average hospital days (SD)	0 (0)	2.32 (5.0)	6.15 (8.9)
Non-Hospice (N=195)			
N(%) hospitalized	65 (33.3%)	101 (51.8%)	120 (61.5%)
Average hospital days (SD)	2.51 (4.8)	5.80 (8.6)	8.94 (11.8)
ALL STATES			
Hospice (N=1,648)			
N(%) hospitalized	30 (1.8%)	228 (13.8%)	531 (32.2%)
Average hospital days (SD)	0.14 (1.3)	1.63 (5.2)	5.33 (11.0)
Non-Hospice (N=4,944)			
N(%) hospitalized	1,919 (38.8%)	2,525 (51.1%)	2,947 (59.6%)
Average hospital days (SD)	4.17 (7.2)	8.44 (13.3)	13.13 (19.7)

***Inpatient acute care from Medicare Inpatient claims.**
SD = standard deviation

Table 19. Hospital Use* by Hospice Enrollment Status at Time of Death
Hospice Patients Receiving Hospice Benefit the Entire Last 90 Days of Life (and the matched non-hospice patients)
1992-1996

	TIME PRIOR TO DEATH		
	30 Days	**90 Days**	**6 Months**
NEW YORK			
Hospice (N=666)			
N(%) hospitalized	10 (1.5%)	16 (2.4%)	100 (15.0%)
Average hospital days (SD)	0.16 (1.5)	0.33 (2.5)	2.42 (7.8)
Non-Hospice (N=1,998)			
N(%) hospitalized	799 (40.0%)	982 (49.1%)	1,144 (57.3%)
Average hospital days (SD)	4.95 (8.2)	9.45 (15.1)	14.80 (22.5)
MAINE			
Hospice (N=17)			
N(%) hospitalized	0 (0.0%)	0 (0.0%)	1 (5.9%)
Average hospital days (SD)	0 (0)	0 (0)	0.76 (3.1)
Non-Hospice (N=51)			
N(%) hospitalized	11 (21.6%)	23 (45.1%)	27 (52.9%)
Average hospital days (SD)	1.80 (4.8)	4.51 (7.1)	9.04 (15.1)
KANSAS			
Hospice (N=249)			
N(%) hospitalized	9 (3.6%)	16 (6.4%)	69 (27.7%)
Average hospital days	0.20 (1.4)	0.39 (1.9)	3.05 (6.0)
Non-Hospice (N=747)			
N(%) hospitalized	273 (36.6%)	393 (52.6%)	451 (60.4%)
Average hospital days (SD)	2.97 (5.1)	6.18 (8.5)	9.12 (12.2)
MISSISSIPPI			
Hospice (N=3)			
N(%) hospitalized	0 (0.0%)	0 (0.0%)	0 (0.0%)
Average hospital days (SD)	0 (0)	0 (0)	0 (0)
Non-Hospice (N=9)			
N(%) hospitalized	7 (77.8%)	7 (77.8%)	8 (88.9%)
Average hospital days (SD)	8.78 (7.7)	14.44 (11.3)	22.78 (22.1)
SOUTH DAKOTA			
Hospice (N=30)			
N(%) hospitalized	0 (0.0%)	1 (3.3%)	5 (16.7%)
Average hospital days (SD)	0 (0)	0.03 (0.2)	1.53 (3.7)
Non-Hospice (N=90)			
N(%) hospitalized	30 (33.3%)	45 (50.0%)	52 (57.8%)
Average hospital days (SD)	2.33 (4.8)	4.48 (6.6)	7.02 (9.2)
ALL STATES			
Hospice (N=965)			
N(%) hospitalized	19 (2.0%)	33 (3.4%)	175 (18.1%)
Average hospital days (SD)	0.16 (1.5)	0.33 (2.2)	2.52 (7.2)
Non-Hospice (N=2,895)			
N(%) hospitalized	1,120 (38.7%)	1,450 (50.1%)	1,682 (58.1%)
Average hospital days (SD)	4.32 (7.5)	8.38 (13.5)	13.02 (20.1)

***Inpatient acute care from Medicare Inpatient claims.**
SD = standard deviation

Table 20. Average and [Median] Medicare Expenditures (in 1996 dollars) in Last Month of Life for Hospice* and Non-Hospice Decedents*

	HOSPICE								
				Inpatient Care					
	Total Hospice	Routine Care	Continuous Care	Respite	General	Medical Skilled Nursing Care	Home Health	Medicare Part A Inpatient Care	Total Medicare
HOSPICE Length of Hospice Stay									
<30 Days (N=519)	1,501 [1,318]	1,348 [1,260]	21 [0]	1 [0]	128 [0]	349.55 [0]	19 [0]	2,138.67 [0]	4,007 [2,767]
30+ Days (N=2,125)	2,473 [2,865]	2,399 [2,847]	8 [0]	1 [0]	65 [0]	80 [0]	2 [0]	318 [0]	2,874 [2,911]
All Hospice Residents (N=2,644)	2,282 [2,765]	2,193 [2,733]	11 [0]	1 [0]	77 [0]	133 [0]	5 [0]	675 [0]	3,096 [2,907]
NON-HOSPICE Matched Hospice Stay**									
<30 Days (N=1,557)		0	0	0	0	899.10 [0]	11 [0]	3,621 [0]	4,532 [2,808]
30+ Days (N=6,372)		0	0	0	0	439.93 [0]	10 [0]	3,573 [0]	4,023 [0]
All Patients (N=7,929)		0	0	0	0	530 [0]	10 [0]	3,583 [0]	4,123 [0]

***For individual hospice decedents, Medicare, SNF, and home health expenditures and non-hospice inpatient expenditures may have incurred prior to hospice admission.**

****Non-hospice decedents are categorized by the length of stay of the hospice decedent to whom they were matched.**

Table 21. Average and [Median] Medicare Expenditures in Last 6 Months of Life for Nursing Facility Hospice* and Non-Hospice Decedents*

	HOSPICE								
				Inpatient Care					
	Total Hospice	Routine Care	Continuous Care	Respite	General	Medical Skilled Nursing Care	Home Health	Medicare Part A Inpatient Care	Total Medicare
HOSPICE Length of Hospice Stay									
<30 Days (N=519)	1,623 [1,466]	1,414 [1,337]	35 [0]	1 [0]	170 [0]	1,931 [0]	432 [0]	7,558 [4,700]	11,544 [8,152]
30-59 Days (N=406)	4,167 [4,044]	3,801 [3,907]	15 [0]	3 [0]	352 [0]	2,033 [0]	215 [0]	5,448 [3,277]	11,863 [8,290]
60-119 Days (N=681)	7,781 [7,972]	7,478 [7,782]	32 [0]	5 [0]	258 [0]	1,414 [0]	114 [0]	4,018 [0]	13,329 [10,841]
120+ Days (N=1,038)	13,392 [15,433]	13,153 [15,239]	28 [0]	5 [0]	205 [0]	338 [0]	33 [0]	974 [0]	14,737 [15,971]
All Hospice Residents (N=2,644)	8,221 [7,070]	7,951 [6,811]	28 [0]	4 [0]	234 [0]	1,118 [0]	160 [0]	3,738 [0]	13,306 [13,087]
NON-HOSPICE Matched Hospice Stay*									
<30 Days (N=1,557)		0	0	0	0	2,367 [0]	295 [0]	9,449 [5,151]	12,110 [7,178]
30-59 Days (N=1,218)		0	0	0	0	2,150 [0]	255 [0]	8,338 [4,499]	10,743 [5,848]

Table 21. (Continued) Average [Median] Medicare Expenditures in Last 6 Months of Life for Nursing Facility Hospice* and Non-Hospice Decedents*

	HOSPICE								
				Inpatient Care					
	Total Hospice	Routine Care	Continuous Care	Respite	General	Medical Skilled Nursing Care	Home Health	Medicare Part A Inpatient Care	Total Medicare
60-119 Days (N=2,043)		0	0	0	0	1,784 [0]	112 [0]	7,676 [3,602]	9,572 [4,704]
120+ Days (N=3,111)		0	0	0	0	1,688 [0]	116 [0]	8,820 [3,667]	10,624 [4,632]
All Non-Hospice Residents (N=7,929)		0	0	0	0	1,917 [0]	172 [0]	8,575 [4,096]	10,663 [5,313]

***For individual hospice decedents, Medicare, SNF, and home health expenditures and non-hospice inpatient expenditures may have incurred prior to hospice admission.**

****Non-hospice decedents are categorized by the length of stay of the hospice decedent to whom they were matched.**

Table 22. Multivariate Analysis of Symptom Management at the End of Life*

	Regular Management of Pain Odd Ratio (95% CI) N=2,014	Receipt of Appropriate Medication for Persistent Mood Disturbance Odd Ratio (95% CI) N=1,129
Demographics		
Male	.88 (.71 - 1.08)	1.03 (.79 - 1.35)
Non-white	.77 (.50 - 1.16)	.53 (.29 - .94)
Married	.96 (.74 - 1.23)	1.07 (.74 - 1.54)
Age**	.98 (.97 - .99)	.98 (.97 - .99)
Clinical		
Activities of Daily Living**	.95 (.86 - 1.05)	.86 (.75 - .98)
Cognitive Performance Scale	1.00 (.94 - 1.06)	.88 (.81 - .95)
Cancer	1.29 (1.01 - 1.65)	1.03 (.77 - 1.38)
Dementia	.93 (.62 - 1.38)	.91 (.58 – 1.45)
Congestive Heart Failure	.72 (.59 - .87)	.92 (.71 - 1.20)
Chronic Obstructive Pulmonary Disease	.96 (.76 - 1.22)	1.08 (.79 - 1.47)
Advance Directives		
Do Not Hospitalize	.87 (.51 - 1.49)	.87 (.48 - 1.58)
Do Not Resuscitate	1.39 (1.13 - 1.71)	1.03 (.78 - 1.36)
Other		
Short Stay	.97 (.71 - 1.22)	.64 (.47 - .86)
States		
New York	.71 (.44 - 1.13)	.61 (.32 – 1.18)
Mississippi	.39 (.15 - 1.04)	1.22 (.35 – 4.21)
Kansas	.76 (.48 - 1.21)	.73 (.38 – 1.40)
South Dakota	.65 (.38 - 1.12)	.63 (.27 - 1.43)
Hospice Effect		
Any Hospice	1.93 (1.56 – 2.38)	1.26 (.94 - 1.67)

* Logistic regression with generalized estimating equation (GEE) and nursing facilities as clusters.
**Per unit increase

Table 23. Multivariate Analysis of the Probability of Hospitalization at the End of Life*

	TIME PRIOR TO DEATH		
	30 Days Odd Ratio (95% CI)	90 Days Odd Ratio (95% CI)	180 Days Odd Ratio (95% CI)
Demographics			
Male	1.10 (.98 - 1.23)	1.11 (.98 - 1.24)	1.15 (1.02 - 1.28)
Non-white	1.20 (.94 - 1.46)	1.26 (.97 - 1.54)	1.21 (.94 - 1.48)
Married	1.06 (.93 - 1.20)	1.06 (.92 - 1.20)	1.17 (1.01 - 1.32)
Age**	.99 (.98 - 1.00)	.99 (.98 - .99)	.98 (.98 - .99)
Clinical			
Activities of Daily Living**	.99 (.94 - 1.05)	1.09 (1.03 - 1.15)	1.08 (1.02 - 1.14)
Cognitive Performance Scale	1.00 (.96 - 1.03)	.96 (.92 - .99)	.95 (.92 - .98)
Cancer	1.01 (.89 - 1.14)	1.07 (.93 - 1.20)	1.20 (1.04 - 1.36)
Dementia	.99 (.82 - 1.16)	.92 (.77 - 1.07)	.91 (.75 - 1.06)
Congestive Heart Failure	1.33 (1.18 - 1.48)	1.37 (1.20 - 1.53)	1.47 (1.30 - 1.64)
Chronic Obstructive Pulmonary Disease	1.06 (.92 - 1.20)	1.08 (.94 - 1.22)	1.09 (.94 - 1.23)
Advance Directives			
Do Not Hospitalize	.62 (.44 - .80)	.67 (.49 - .84)	.60 (.46 - .74)
Do Not Resuscitate	.58 (.51 - .64)	.63 (.56 - .71)	.65 (.57 - .73)
Other			
Short Stay	1.31 (1.15 - 1.46)	3.22 (2.76 - 3.67)	5.90 (4.74 - 7.05)
States			
New York	2.43 (1.60 - 3.27)	1.78 (1.26 - 2.30)	1.58 (1.08 - 2.08)
Mississippi	5.68 (2.15 - 9.21)	5.17 (1.63 - 8.71)	4.31 (1.20 - 7.43)
Kansas	1.99 (1.30 - 2.68)	1.66 (1.17 - 2.16)	1.51 (1.02 - 2.00)
South Dakota	2.12 (1.29 - 2.96)	1.78 (1.13 - 2.45)	1.62 (.80 - 2.44)
Hospice Effect			
Any Hospice	.30 (.25 - .34)	.39 (.34 - .45)	.55 (.48 - .63)

* Logistic regression with generalized estimating equation (GEE) and nursing facilities as clusters.
**Per unit increase

Table 24. Multivariate Analysis of Hospital Days at the End of Life*

	TIME PRIOR TO DEATH		
	30 Days Odd Ratio (95% CI)	90 Days Odd Ratio (95% CI)	180 Days Odd Ratio (95% CI)
Demographics			
Male	1.11 (1.02 – 1.21)	1.12 (1.04 - 1.21)	1.13 (1.05 - 1.21)
Non-white	1.11 (.94 - 1.27)	1.12 (.98 - 1.25)	1.15 (1.01 - 1.29)
Married	1.03 (.93 - 1.13)	1.10 (1.00 - 1.19)	1.11 (1.03 - 1.20)
Age**	.99 (.98 - .99)	.98 (.98 - .99)	.98 (.97 - .98)
Clinical			
Activities of Daily Living**	1.05 (1.01 – 1.10)	1.17 (1.13 - 1.21)	1.17 (1.13 - 1.20)
Cognitive Performance Scale	1.00 (.98 - 1.03)	.98 (.96 – 1.00)	.97 (.95 - .99)
Cancer	1.04 (.94 - 1.14)	1.13 (1.04 - 1.22)	1.15 (1.07 - 1.24)
Dementia	1.07 (.93 - 1.22)	1.08 (.95 - 1.20)	1.13 (1.01 - 1.25)
Congestive Heart Failure	1.26 (1.16 – 1.36)	1.27 (1.19 - 1.36)	1.28 (1.20 - 1.36)
Chronic Obstructive Pulmonary Disease	1.07 (.97 - 1.18)	1.06 (.98 - 1.15)	1.10 (1.03 - 1.18)
Advance Directives			
Do Not Hospitalize	.60 (.44 - .77)	.72 (.58 - .87)	.67 (.57 - .78)
Do Not Resuscitate	.66 (.61 - .72)	.74 (.68 - .79)	.78 (.72 - .84)
Other			
Short Stay	1.21 (1.10 - 1.32)	2.00 (1.86 - 2.15)	2.23 (2.08 - 2.38)
States			
New York	2.36 (1.61 - 3.13)	2.28 (1.81 - 2.75)	1.88 (1.53 - 2.22)
Mississippi	2.55 (1.50 - 3.59)	2.03 (1.44 - 2.63)	1.53 (1.09 - 1.97)
Kansas	1.47 (1.00 - 1.95)	1.34 (1.06 - 1.62)	1.02 (.83 - 1.22)
South Dakota	1.43 (.92 - 1.94)	1.18 (.89 - 1.47)	.92 (.70 - 1.14)
Hospice Effect			
Any Hospice	.37 (.32 - .43)	.55 (.49 - .61)	.70 (.64 - .76)

*Linear regression with the Poisson model and generalized estimating equation (GEE) and nursing facilities as clusters.

**Per unit increase

Appendix A

Data and Variables Used for Hospice in Nursing Facility Analyses-- Reports 4 & 5

DATA SOURCES

Resident Assessment Instrument (the Minimum Data Set or MDS)

The Omnibus Budget Reconciliation Act of 1987 (OBRA '87) contained the most far-reaching revisions to the standards, inspection process and enforcement system in nursing facilities since the passage of Medicare and Medicaid in 1965 (Hawes, 1998). A major feature of this legislation was the introduction of a uniform, comprehensive resident assessment instrument (the MDS) to guide the clinical care planning process in order to systematically document residents' needs. The MDS is not only used to systematically assess the resident and to generate a comprehensive care plan to document clinical progress as that plan is implemented, but it is used by regulators to focus on resident outcomes and by facilities to improve their performance. In the time period studied here documentation of the resident assessments were required: at admission (by 15th day), quarterly (by 90th day), and annually (by 365th day). Reassessments were required when a resident was readmitted after hospital admissions and when significant change occurred. Resident assessments were to have been completed on all nursing facility residents cared for in facilities receiving any Medicare or Medicaid payment. These nursing facilities represent 96 percent of the facilities in the United States.

Topics covered in the MDS include cognitive function, communication/hearing problems, physical functioning, continence, psychosocial well-being, mood state, activity and recreation, disease diagnoses, health conditions/symptoms, nutritional status, oral/dental status, skin condition, special treatments, and medication use. A number of studies (Morris et al., 1994; Frederiksen et al., 1996; Hartmaier et al., 1994 & 1995; Phillips et al., 1993; Mor et al., 1994) demonstrate that researchers and clinicians using the MDS can achieve high levels of inter-rater reliability. Using an earlier version of the data set used in this study, Gambassi and colleagues

found reasonably high levels of validity and good internal consistency comparing diagnoses on the MDS with HCFA claims and medical conditions with patterns of use of specific drugs (Gambassi et al, 1988). While the accuracy of the MDS data have been questioned (Berlowitz et al., 1997; Kramer et al., 199), and considerable anecdotal evidence reveals that some facilities have not taken the time to train their staff properly in its use, it is unlikely that misclassification errors in recording of information will be differential with respect to the outcomes of interest.

For the comparative study hospice and non-hospice patients had to have had at least 2 MDS assessments performed. The need for the presence of 2 MDS assessments for our comparative analyses was originally recognized after preliminary analysis documented the presence of ascertainment bias on selected symptoms. Specifically, hospice residents were significantly more likely to have pain and dyspnea recorded than were non-hospice decedents. For example, controlling for other patient factors, residents with a dementia diagnoses were 3 times as likely to have pain recorded than were non-hospice residents. Therefore, to more correctly represent the hospice influence on the presence and management of symptoms (rather than merely the increased likelihood of hospice to assess symptoms) we felt that it was necessary to control for the status of symptoms at the time of the penultimate MDS.

Health Care Financing Administration (HCFA) Claims Data

The HCFA claims data were merged to the MDS file using the Health Insurance Claim number of Medicare beneficiaries. To ensure confidentiality, these identifiers were replaced with unique identifiers using the claim number as a seed. Two files (beneficiary information and claims data) comprise the HCFA data. The beneficiary file (Denominator file) contains gender, date of birth, and survival status (verified date of death). The claims data used include all Medicare Part A claims including hospital, skilled nursing facility, hospice, and home health

agency claims. We achieved a match rate of MDS data to HCFA beneficiary data of approximately 85 percent using HCFA data from 1991through 1997.

Drug data

As part of the resident assessment, nursing facility staffs code up to eighteen drugs taken within the seven days preceding the assessment. Nursing home staffs code each drug according to the National Drug Coding (NDC) system. Field tests of the MDS showed that 100 percent of the medication use items were reliable with the average reliability being 0.73 (Hawes et al., 1995b). While prescription drug products must use an NDC, most non-prescription drugs are also primarily referenced by the NDC. NDCs are unique 11-digit codes that identify discrete drug products. The first five digits refer to the manufacturer. The next four digits correspond to the drug product. The last two digits indicate the packaging. As pharmaceutical companies merge, new products are introduced, and drugs are no longer active, changes in NDCs occur continuously. Consequently, the NDCs are commercially-oriented and do not contain any mechanism to group drugs according to ingredients or categories of ingredients. Therefore, linking NDCs to specific descriptive information is critical to enable research. This NDC matching entails several steps. To match the NDC codes, we used a historical reference archive for drug products that listed all NDCs ever attributed and eventually discontinued between 1991 and 1996. For scientific drug research, we translated NDC codes into a hierarchical therapeutic classification scheme as recommended by WHO (Pahor et al., 1994). NDC codes were merged to useable therapeutic class and sub-class information using the Master Drug Data Base (MediSpan™) (1995). MediSpan™ contains complete records for prescriptions common in retail pharmacy as well as unit-dose and injectables used by hospitals and external facilities. MediSpan™ now includes over 100,000 generic drug products, products from regional

manufacturers, and information on over 90,000 inactive drugs. The hierarchical identifier, the Generic Product Identifier (GPI) contained in MediSpan™, is a 14-character field consisting of seven subsets, each providing increasingly more specific information about the drug. (See below example.) While MediSpan™ incorporates the American Hospital Formulary Service (AHFS) (1994), a classification system based on the pharmacological uses of drugs, MediSpan™ also groups drugs with comparable compounds in the same therapeutic class and allows the same drug to be classified into multiple therapeutic classes.

Medi-span™ classification system - example of an antidepressant

GPI	Coding	Example
58-	Drug group	Antidepressants
58-20-	Drug class	Tricyclic agents
58-20-00-	Drug sub-class	--
58-20-00-60	Drug name	Nortriptyline
58-20-00-60-10	Drug name extension	Hydrochloride
58-20-00-60-10-01	Dosage form	10mg

A recent study analyzed the MDS drug codes with respect to: 1) completeness; 2) internal consistency; and 3) external validity (Gambassi et al., 1998). Investigators found the overall match rate between the NDC and the MediSpan™ greater than 90 percent with only 5.4 percent of the original NDC codes contained in the MDS data from the states being studied in this project to be incomplete or incorrect. Gender-specific medications had a high concordance with gender (> 90 percent). For example, all residents taking tamoxifen were women; all residents taking goserelin were men; and 92 percent of estrogen users were women. Cross-linkages between drugs and MDS condition variables revealed adequate to high rates of concordance

(range: 51 percent (gout) - 100 percent (rheumatoid arthritis)). High rates of concordance were reported when cross-checking levo-dopa with Parkinson's disease (88.9 percent); hypoglycemic agents with diabetes mellitus (93.2 percent); and sore care products with pressure sores (83.7 percent). These data show that the MDS drug data are consistent and reliable (Gambassi et al., 1998).

Hospice Provider of Service File

The Provider of Service (POS) File is compiled and managed by HCFA to determine the capacity of Medicare/Medicaid institutional providers to render acceptable care. This file contains information on program characteristics, collected by State surveyors under Federal guidelines. Since the periodic inspection of hospices is not mandated, surveys are conducted according to state priorities and resources, and, as a consequence, hospice and nursing facility data does not match across time. We used the hospice provider number on the HCFA hospice claim to link the hospice provider information to MDS and claims data. For our descriptive analyses, we used 1995 hospice provider information. For our analyses we were most interested in hospice provider type (freestanding or home care, hospital or nursing facility based), and ownership.

VARIABLES

Table of Variables

Table A1 lists all variables studied in both the descriptive and comparative hospice in nursing facility analyses. Variable measurement and data source are shown. For selected variables, the text below provides more information on their documentation and/or their reliability and validity.

Pain

Pain was not a major focus of the MDS version used in these states during the time period in question, and, as such, there are several limitations to the measure used in these analyses. A major limitation is that the level of pain intensity is not recorded; the newer MDS 2.0 requires documentation of pain intensity.

The MDS pain data used in this study is based on assessment by nursing personnel which is supposed to be performed according to instructions provided in the MDS manual (HCFA, 1991). Nursing home personnel are supposed to evaluate signs and symptoms of pain, but since pain is a subjective experience, they are instructed to record whatever the residents said it was. Residents were to be asked whether they had experienced any pain in the last seven days. Furthermore, residents were to be asked to describe the pain and how often it was manifest. To elicit complete and satisfactory answers, the assessors were instructed to ask neutral and non-directive questions. Questions such as: "*What do you mean?*" "*Tell me what you have in mind*." "*Tell me more about that*." "*Please be more specific*." "*Give me an example*". Moreover, the assessors were instructed to validate their understanding of what the resident was really saying. Statements like "*I think I hear you saying that .....*" or "*Let's see if I understood you correctly. You said ..... Is it right?*" were suggested in the MDS Instruction Manual.

For MDS assessment purposes, pain refers to any type of physical pain or discomfort in any part of the body experienced on a daily basis. If the assessor had difficulty discriminating the frequency, the instructions were to code as daily. Pain could have been localized or more generalized. It could have been acute or chronic, continuous or intermittent, occurring at rest or with movement. Pain recording could have depended exclusively on the observation of signs of pain. According to the MDS Manual, these include moaning, crying, and other vocalizations;

wincing or frowning and other facial expressions; or body posture such as guarding/protecting an area of the body, or lying very still. In these cases, the assessors were instructed to ask the nurse assistants and therapists who might have been working with the resident, whether he/she had complaints or signs of pain during their shifts. In some residents, those who have dementia and cannot verbalize the pain experience, the assessor was instructed to look for particular behaviors such as calling out for help, pained facial expressions, refusing to eat, or striking out at a nurse assistant who was trying to move them or touch a body part.

Dyspnea

Shortness of breath (dyspnea) is recorded on the MDS if the problem is present in the "last 7 days" prior to completion of the MDS assessment. The degree or frequency of dyspnea is not indicated, only its presence. We compare the presence or absence of dyspnea in hospice versus non-hospice decedents stratifying for its presence on the penultimate MDS assessment.

Persistent Mood Disturbance

Persistent mood disturbance is defined as "persistent sad or anxious mood that has existed over the last 7 days and was not easily altered by attempt to "cheer up" the resident." (MDS+ Reference Manual, 1993) For MDS assessment purposes, a sad or anxious mood is a distressed mood that is characterized by explicit verbal or gestural expressions of feeling depressed or anxious (or a synonym such as feeling sad, miserable, blue, hopeless, empty, or tearful). Assessors are instructed to draw upon their own interactions with the residents as well as to statements of direct-care staff, social workers, and licensed personnel who may have evaluated the resident in this area. Suggested cues are: Does the resident cry or look dejected (unhappy) when no one is talking with him or her? When you talk with the resident, does he or she sound

hopeless, fearful, sad, anxious? Does the resident appear withdrawn, apathetic, without emotion? (MDS+ Reference Manual, 1993)

Cognitive Performance

The MDS includes seven direct measures of cognition: short and long term memory, recall or orientation items (season, location or room, staff names/faces, orientation to nursing home), and decision-making ability. Good reliability (0.7) of these items has been reported (Hawes et al, 1995b). The cognitive performance scale (CPS) used in this study is a categorical measure of cognition using these MDS items and several items which indirectly evaluate cognitive function (i.e. comatose state, total dependent eating) (Morris et al., 1994). Based on two standard cognitive assessment tools, the Mini-Mental State Examination (Folstein et al., 1975) and the Test for Severe Impairment (Albert & Cohen, 1992), the CPS has excellent reliability with estimates published in the range of 0.66 - 0.88 (159). Using the MMSE as the gold standard, the CPS has high sensitivity (> 90 percent) and specificity (> 85 percent), yielding high diagnostic accuracy, regardless of patient education level (Hartmaier et al., 1995). Furthermore, the CPS has excellent reproducibility (Kappa >0.76) (155).

Activities of Daily Living

The reliability of the ADL scores range from 0.87-0.92 (Hawes et al., 1995b) and is highly correlated (0.89) with the Physical Signs and Symptoms Scale (Lawton & Brody, 1969). Furthermore, a recent study found these measures useful in pharmacoepidemiologic studies (Bernabei et al., 1998).

Table A1. Comparative Descriptive and Analytic Analyses--Variables, Measures, and Data Sources Outcomes

Type	Variable	Empirical Measure	Source Data
Patient	Acute Care Hospitalization and Average Hospital Days --in 30 days prior to death --in 90 days prior to death --in 6 months prior to death	Hospice decedents in hospice for total time period studied (and their matched controls) who have acute care hospitalization / hospice decedents in hospice for total time period studied (and their matched controls) Days in hospital in time period for hospice decedents in hospice for total time period studied (and their matched controls) / hospice decedents in hospice for total time period studied (and their matched controls)	Medicare Part A Hospital Claims
	Pain Management (regular treatment)	Decedents in pain and receiving WHO level analgesia at least twice a day, or, for level III drugs, having a drug patch	Resident Assessment and Drug Information
	Persistent Mood Disturbance (treatment of)	Decedents with persistent mood disturbance and receiving antiananxiety or antidepressant medication in the 5 to 7 days prior to MDS assessment data	Resident Assessment

Independent Variables

Type	Variable	Empirical Measure	Source Dataset
Patient	Hospice enrollment	Resident elected hospice prior to nursing facility admission.	Medicare hospice claims and Resident assessment

Covariates and variables for descriptive comparisons.

Type	Variable	Empirical Measure	Source Dataset
Facility-Nursing Facility	Hospice Concentration	Unduplicated nursing facility residents on Medicare hospice in given year/unduplicated nursing facility residents in a given year.	Medicare hospice claims and Resident Assessment
Facility-Hospice	For-profit ownership	A for-profit organization controls and operates the hospice.	Hospice Provider of Service File
	Government ownership	A government entity controls and operates the hospice.	"
	Organizational type	Hospice is freestanding or under administrative control of a hospital, home health agency or nursing home.	"
Level	**Variable**	**Empirical Measure**	**Source Dataset**
Patient	State of residence	State location of nursing facility in which resident resides	Resident Assessment
	Year of death	Year in which resident died	HCFA Denominator File
	Race / Ethnicity	White / Afr.Am. / Latino / Native Am./Asian	"
	Gender	Female / Male	"
	Age	Years	"
	Marital Status	Married / Widowed or Divorced / Separated / Never married – most recent status	Resident Assessment
	Activities of daily living	ADL score – see text	"
	Cognitive performance	CPS score – see text	"

Table A1. (Continued) Comparative Descriptive and Analytic Analyses--Variables, Measures, and Data Sources
Outcomes

Level	Variable	Empirical Measure	Source Dataset
	Body Mass Index	Weight (kg)/height ^{2} (m^2)	Resident Assessment
	Diagnosis	Diagnostic categories of 1)Cancer without dementia 2) Cancer with dementia 3)Alzheimer's disease/ dementia, 4)Other	Resident Assessments, Inpatient Claims 6 months before NF adm. & during stay
		Individual selected diagnoses for multivariate analysis.	Resident Assessment
	Pain	Complains or shows evidence of pain daily or almost daily (in 7 days prior to assessment).	Resident Assessment
	Dyspnea	Difficulty breathing occurring at rest, with activity, in response to illness or anxiety, or when lying flat.	"
	Persistent Mood Disturbance	Persistent sad or anxious mood that has existed over the last 7 days and was not easily attended by attempt to "cheer up" the resident.	"
	Vomiting	Vomiting in 7 days prior to assessment.	
	Analgesic consumed	Analgesic level received by WHO I, II and III levels, and daily frequency for multivariate analysis.	Resident Assessment and Drug Information
	IM medications	Any drug given intramuscularly.	
	IV medications	Any drug or biological (e.g., contrast material give by IV push or drip) in the 7 days prior to assessment.	Resident Assessment
	Tube feedings	Presence of any tube that can deliver food/nutritional substances, other directly into the gastrointestinal system.	"
	Restraints	Any use of trunk or limb restraints or chair that prevents rising in 7 days prior to assessment.	"
	Therapies	Any speech, occupational or physical therapy in 7 days prior to assessment.	"
	Advance directives--	Documentation of preference must also be present in resident's healthcare record.	"
	Do not resuscitate	"	"
	Do not hospitalize	"	"
	Feeding restrictions	"	"
	Medication restrictions	"	"
	Other treatment restrictions	"	"
	Average Expenditures--	Total expenditures per category divided by decedents (hospice, non-hospice and total).	Medicare claims
	Hospice--Routine home care	--for 30 days (stratified by hospice lengths of stay of : <30 days and 30+ days)	
	Continuous home care		
	Respite inpatient		
	General inpatient	--for last 6 months (stratified by hospice lengths of stay of: <30 days, 30-59 days, 60-119 days and 120+ days)	
	Physician visits		
	Medicare Part A--		
	Acute care hospital	Non-hospice decedents are placed in the length of stay category of the hospice case to which they are matched.	
	Skilled nursing		
	Home health care		

REFERENCES

Albert, M. and Cohen, C. The Test for Severe Impairment: An instrument for the assessment of patients with severe cognitive dysfunction. J Am Geriatr Soc. 1992 May; 40(5):449-53.

American Hospital Formulary Service (AHFS)Drug Information. Bethesda, MD: American Society of Hospital Pharmacists; 1994.

Berlowitz, D. R.; Brandeis, G. H., and Moskowitz, M. A. Using administrative databases to evaluate long-term care. J Am Geriatr Soc. 1997 May; 45(5):618-23.

Bernabei, R.; Gambassi, G.; Lapane, K.; Landi, F.; Gatsonis, C.; Dunlop, R.; Lipsitz, L.; Steel, K., and Mor, V. Management of pain in elderly patients with cancer. SAGE Study Group. Systematic Assessment of Geriatric Drug Use via Epidemiology [see comments]. JAMA. 1998 Jun 17; 279(23):1877-82.

Folstein, M. F.; Folstein, S. E., and McHugh, P. R. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975 Nov; 12(3):189-98.

Frederiksen, K.; Tariot, P., and De Jonghe, E. Minimum Data Set Plus (MDS+) scores compared with scores from five rating scales. J Am Geriatr Soc. 1996 Mar; 44(3):305-9.

Gambassi, G.; Landi, F.; Peng, L.; Brostrup-Jensen, C.; Calore, K.; Hiris, J.; Lipsitz, L.; Mor, V., and Bernabei, R. on behalf of the SAGE study group. Validity of diagnostic and drug data in standardized nursing home resident assessment: Potential for geriatric pharmacoepidemiology. Medical Care. 1998; 36(2):167-179.

Hartmaier, S. L.; Sloane, P. D.; Guess, H. A., and Koch, G. G. The MDS Cognition Scale: A valid instrument for identifying and staging nursing home residents with dementia using the minimum data set [see comments]. J Am Geriatr Soc. 1994 Nov; 42(11):1173-9.

Hartmaier, S. L.; Sloane, P. D.; Guess, H. A.; Koch, G. G.; Mitchell, C. M., and Phillips, C. D. Validation of the Minimum Data Set Cognitive Performance Scale: Agreement with the Mini-Mental State Examination. J Gerontol A Biol Sci Med Sci. 1995 Mar; 50(2):M128-33.

Hawes, C. Regulation and the politics of long-term care. Generations Journal of the American Society on Aging. 1998; 21(4):5-9.

Hawes, C.; Morris, J. N.; Phillips, C. D.; Mor, V.; Fries, B. E., and Nonemaker, S. Reliability estimates for the Minimum Data Set for nursing home resident assessment and care screening (MDS). Gerontologist. 1995b Apr; 35(2):172-8.

Health Care Financing Administration (HCFA). Minimum data se plus multistate nursing home case mix and quality demonstration training manual. Natick, MA: Eliot Press; 1991.

Lawton, M. and Brody, E. Assessment of older people: Self-maintaining and instrumental

activities of daily living. The Gerontologist. 1969; 9179-186.

Mor, V.; Allen, S., and Malin, M. The psychosocial impact of cancer on older versus younger patients and their families. Cancer. 1994 Oct 1; 74(7 Suppl):2118-27.

Morris, J. N.; Fries, B. E.; Mehr, D. R.; Hawes, C.; Phillips, C.; Mor, V., and Lipsitz, L. A. MDS Cognitive Performance Scale. J Gerontol. 1994 Jul; 49(4):M174-82.

Pahor, M.; Chrischilles, E. A.; Guralnik, J. M.; Brown, S. L.; Wallace, R. B., and Carbonin, P. Drug data coding and analysis in epidemiologic studies. Eur J Epidemiol. 1994; 10(4):405-411.

Phillips, C. D.; Chu, C. W.; Morris, J. N., and Hawes, C. Effects of cognitive impairment on the reliability of geriatric assessments in nursing homes. J Am Geriatr Soc. 1993 Feb; 41(2):136-42.